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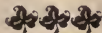
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San Francisco, California
2006

The Irrigation Age



The Pioneer Journal of its Kind in the World and
the Leading Representative of the
Irrigation Industry:



VOLUME XII.

October, 1897, to September, 1898.



JAMES E. FORREST, Publisher.

916 WEST HARRISON STREET



CHICAGO.

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THE IRRIGATION AGE.

AN ILLUSTRATED MONTHLY.

Edited by GEORGE E. GIRLING.

THE IRRIGATION AGE is a Journal of Western America, recognized throughout the World as the exponent of Irrigation and its kindred industries. It is the pioneer journal of its kind in the world and has no rival in half a continent. It advocates the mineral development and the industrial growth of the West.

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112 Dearborn St.

FARM AND ORCHARD HOMES NEAR DENVER.

HOW TO OBTAIN A HOME AND AN INCOME AT SMALL COST.

NO section of the Rocky Mountain region is just now receiving greater attention than the region immediately surrounding Denver, Colo., and this is especially true of the Cherry Creek valley, southeast of the city, and for this there are numerous reasons. In its broad, smooth extent, in the depth and fertility of its soil, in the abundance and constancy of its water supply, as well as in the geniality, salubrity and health-restoring qualities of its climate, it is without a counterpart in all this upland region.

Here, under the bluest of skies, and with an incomparable all-the-year-round climate, dry, bracing and health-restoring, the great possibilities of this sun-bathed region for fruit growing, live stock raising and general farming are being realized. Especially will this locality attract those whose health requires an outdoor life in the dry, elevated region of the Rocky Mountains, and these will there find not only the health they seek but also profitable occupation and a business career.

But it is not to the invalid or semi-invalid only that the idea of a home near Denver will appeal. There are thousands in our large cities who are becoming weary of the grind and drudgery of city life; who sigh for the country and green fields; who feel that they and their growing families would be healthier could they but get away from the brick and mortar and out of the narrow streets. They have been looking toward the Rocky Mountain region in the belief that there is for them the home of health and prosperity and independence for which they long. In this region, with

its dry pure air and its almost continual sunshine, many of those whom ill-health is driving from the humid climates of the eastern states will secure the great boon of returning health, while the occupation in the orchard or the garden or the dairy affords the out door life so essential in effecting the cure. How immeasurably better, in all respects, is such a life compared with that of the conventional health resort does not need to be pointed out.

THE CITY OF DENVER.

Thirty-odd years ago when the site of Denver was marked by a few log shanties, no one expected it to become the dominant city of the West. But its growth has been both rapid and permanent, and to-day it is the most important city between the Missouri river and San Francisco. The attractions and merits of Denver cannot be condensed into a few paragraphs. It has become a saying that it is unsafe to stop over at Denver, as an irresistible charm is worked to create restlessness and dissatisfaction elsewhere, and the visitor yields to the spell and cares not to leave.

Denver is beautifully situated at the meeting point of the plains and the foot hills. On the east stretches one hundred and seventy-five miles of prairie to the Colorado state line, and on the West it is only twelve miles to the mountains. No visitor has ever been fully prepared for the beauty of the city in its public and private buildings, its magnificent business structures of granite and marble and pressed brick, finished with onyx, its commodious hotels; its stately churches, and,

more than all else, its beautiful and exquisite homes, and in no community of Denver's size do better schoolhouses stand. There are no tenement houses to work their harm to health and happiness, but according to the United States census officials Denver ranks first in the country in the number of homes to her population.

As a business and financial center Denver claims as her kingdom the entire country between the Missouri river and the Sierra Nevadas and from the gulf to the British provinces. Its banks and commercial establishments and factories are unsurpassed. Its street railways, with a complete system of transfers without additional fare, astonishes everyone.

Denver is amply supplied with steam railroads; in every direction the steel threads lead. It is the terminal point of nine immense railroad systems, and from its magnificent union depot scores of trains arrive and depart every day.

As a manufacturing center it is becoming of the greatest importance. The immense car shops of the Union Pacific railroad are here located, employing thousands of men. The largest smelters in the world employ thousands of others, and then there are numerous other industries, the paper mills, the cotton mills, the furniture and shoe and soap factories, and the iron foundries and machine shops. All these and many more open a vast market for raw material, and the workers in the factories are the consumers of the products of the orchard, the farm and the dairy.

THE LAND AND LOCATION.

The property of the Denver Land and Water Company comprises about 17,000 acres of land, the first section of which is just seven and a half miles south of the center of the city of Denver and only about three miles south of the city limits. The lands now on sale are from eight to ten miles from the heart of the city; about an hour's drive.

THE WATER SYSTEM.

The irrigation system consists of a large main reservoir, Castlewood Lake, capable

of holding 250,000,000 cubic feet of water; a main canal thirty miles long and laterals in all forty-two miles, making the total length of ditches seventy-two miles. The reservoir, canal and laterals are already completed. The company has also projected four other reservoirs which will act as distributing points. These reservoirs will have a combined capacity equaling that of Castlewood Lake, and the lake or main reservoir will then become a "great catch basin." One of these lower reservoirs is already built and in operation. The others will not be needed until a vast body of land is under cultivation. The irrigation system is one of the largest and most complete in the state of Colorado, and the company has never suffered from a shortage of water.

SOIL AND PRODUCTS.

The soil is a rich sandy loam with clay subsoil, is free from alkali and is very fertile. It is adapted to all kinds of fruits, apples, pears, plums, prunes, cherries, strawberries, gooseberries, etc., all kinds of vegetables and all kinds of grain and field crops. Alfalfa does remarkably well and this is an ideal location for dairy farming as Denver is a market for all the milk and butter and cheese produced, and several creameries are already in operation not far from this property. At present the farmers take their milk to Littleton or Sedalia, six to eight miles distant, every day in the summer time.

CLIMATE.

The climate is the famous climate of the Rocky Mountain region, and when that is said, it covers everything that can be desired.

This section is noted principally for the relief it affords to all suffering from pulmonary diseases, from catarrh, and diseases of the throat and bronchial tubes. It is due to the dryness, equability of temperature, plenty of sunshine, and absence of high winds with cool nights, which aid recuperation. Life in the open air with plenty of exercise, either in the way of

recreation or life employment, is especially beneficial.

The death rate is very low, and the United States census returns show the following percentages:

Colorado.....	0.94
Indiana.....	1.03
Ohio.....	1.11
Florida.....	1.21
Virginia.....	1.24
Kansas.....	1.25
Illinois.....	1.33
Pennsylvania.....	1.49
New York.....	1.58
California.....	1.61
Massachusetts.....	1.77
Louisiana.....	2.00
Arizona.....	2.61

Compare Florida and California, states which are noted as health resorts, whence thousands seeking a renewal of impaired health, flee in hope of restoration, with Colorado, and both are seen to fall below the state in the heart of the Rockies.

The average velocity of the wind at Denver is 6.3 miles. Compare this with Boston 9.2 miles; San Francisco 9.3, and Cheyenne 10.6. There are no cyclones or blizzards or damp winds. The nights are always cool in summer. The air is pure and dry and invigorating. The heat in the summer (which is never excessive) is not nearly so uncomfortable as in a lower attitude and more humid climate. There is no rainy season nor are there any fogs.

PRICE AND TERMS.

The price of lands is carefully graded according to location and quality, and ranges from \$50 to \$150 an acre. The average price of the land in the sections platted in five and ten-acre tracts and suitable for fruit is \$100. The terms are very liberal. A small payment at the time of purchase and balance in one, two, three, four and five years with inter-

est on deferred payments at 6 per cent. Special terms will be made those who locate and begin immediate improvement.

INDUCEMENTS TO COME.

There are inducements enough to justify you in the trip itself as a pleasure trip. Come by either route you choose, you will traverse the broad prairies and great plains, and you will pass through some of the grandest scenery the world affords. You may see, too, according as your taste and pleasure may dictate, the beauties of nature in its loveliest aspect, or you may witness the attempts to subjugate it for the utility of man.

If you come from the prairies of the Central West the contrast will be as pleasant as it is extreme. If you come from the far East you will enjoy nature as exhibited here on a far grander scale than it is presented in the comparatively low range of the Alleghanies along the eastern coast.

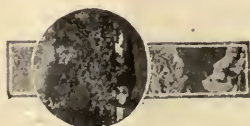
Come at whatever season you may it will be a pleasurable experience. Although the autumn or springtime will, of course, present much greater contrasts of color, and the trip then will be attended with greater comfort and personal enjoyment, yet a winter trip offers its own peculiar inducements.

GOOD FOR YOUR HEALTH.

If you are out of health the trip will certainly be beneficial to you. If you are a sufferer from chronic diseases there are hot springs which rival those of Arkansas, and medicinal springs which have effected notable cures.

Further detailed particulars will be cheerfully furnished upon application.

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CHAS. S. FEE, Gen. Pass. Agt., ST. PAUL, MINN.



THE RETURN FROM THE HUNT.

THE IRRIGATION AGE.

VOL. XII.

CHICAGO, OCTOBER, 1897.

NO. 1.

THE PROGRESS OF WESTERN AMERICA.

The Hope of Irrigation. Irrigation is not merely a matter of turning the water into a ditch for the benefit of a field of cabbages. It is a great national question, still far from being settled or even understood. The object of the irrigation movement is to build a new empire in the arid regions of the west. The foundation of that empire is the water supply and irri-gable land, its topmost arch a nobler civi-lization than the world has yet seen, based upon social equality, democratic liberty, and the greatest average prosperity. A civilization where want and misery will be reduced to a minimum, energy and thrift be justly rewarded, and good fellowship abound. No question of politics is of greater importance than this: it comprises within its scope all that is good of both social and political economy. The ques-tion of slavery was not confined to the South, the question of irrigation is not confined to the West. It is of national importance and it is becoming the ques-tion of the hour.

Something Already Done. The groundwork for this mighty empire has already been partially surveyed and platted and the lines are marked by the steel threads of railroads traversing the country in every direction. The work of reclama-tion and settlement was begun, carried forward rapidly sometimes, and again haltingly. It stands to-day upon the

threshold of a tremendous forward move-ment and the responsibility for the proper control and direction of that movement rests upon the men of Western America. They cannot in justice to themselves shirk their duty. The problem must be faced and it must be solved, and upon its correct solution depends not only the wel-fare, happiness and prosperity of the pres-ent, but of future generations. A broad, comprehensive and liberal policy should be urged toward the development of this vast public domain. Statesmen are needed with the patriotism and self-sacrifice of a Lincoln and the inflexibility of a Bismarck, in the line of duty.

Self Help the Watchword. But dependence should not be placed entirely upon the National Government. The immediate hope of irrigation lies not in the direction of an all-wise governmental policy and financial assistance. It is not to be expected that the United States Congress will suddenly turn from its pleasures of tariff play and Cuban war and Hawaiian annexation, and incidentally, vast appropriation bills for rivers and harbors and other things, and give its earnest attention and serious con-sideration to this matter of irrigation. Unity of action by special interests or lack of opposition may result occasionally in the passage of a bill, beneficial or other-wise, but the watchword of the friends of

irrigation must be Self-Help. True, Congress may, and perhaps will, to a limited extent and in a perfunctory manner, move along certain lines, but the appropriations therefor will undoubtedly be greatly restricted and entirely inadequate.

The States' Duty. It is the duty of each state to take up this all-important question and to investigate it thoroughly and completely so far as it relates to land and water within its own boundaries and the best interests of the citizens therein. Until this is done the real needs of the state are not known or understood. It is useless to run wildly to Congress on every trivial question which may arise, many of them of a purely selfish nature, and their instigators trusting that under cover of something else a bill may be pushed through that will be to their personal gain. The first necessity is an intelligent understanding of the needs of the several states, and as far as possible an earnest attempt to work out their own salvation. The question of interstate waters is a legitimate one for Congress, but that body will never take any beneficial action thereon unless the conflicting interests of the states are understood and a united effort made to adjust them without prejudice or bias. Unless the men of the West make an effort to agree upon some common points, they need expect but little from the federal authorities.

The Home-seeker's Convention. The first National Homeseekers' Convention, which was held in Chicago beginning September 20, 1897, was unique in the annals of conventions. It was composed of delegates appointed by the governors of the states and territories. There were representatives present at the convention from Alabama, Colorado, Idaho, Illinois, Kansas, Louisiana, Maryland; Mississippi, Minnesota, Montana, Nebraska, North Carolina, South Carolina, South Dakota and Utah. It was an intelligent, representative and able body of men. The problems discussed were of a thoroughly practical nature,

comprising the necessity of furnishing the homeseeker or prospective settler with impartial information regarding lands and locations, thus preventing him from falling into the hands of unscrupulous land agents, also the necessity of more simple and perfect laws to facilitate the transfer of land ownership. Other topics of vital importance to homeseekers were discussed and the convention completed its work by the organization of a permanent association and the following officers were elected: Congressman James Gunn, of Boise, Idaho, President; Marcus P. Beebe, of Ipswich, South Dakota, First Vice-President; Frank H. Dryden, of Maryland, Second Vice-President; George E. Girling, of Chicago, Secretary and Treasurer; Rev. Dr. John Rusk, pastor of the Militant Church, Chicago, Delegate-at-Large. An executive committee of one member from each state was also elected. A brief synopsis of the resolutions appears elsewhere in this issue.

Looks Better for the Companies. A brighter outlook for irrigation companies is in evidence. The past three years has seen a great many of them placed in the hands of receivers. The next twelve months will see the majority of them reorganized on better and more secure financial foundations. A notable instance of this tendency is that of the Denver Land and Water Company, previously the Denver Land and Water Storage Company. This enterprise, while not the largest, was one of the most important in all the western states on account of its proximity to the city of Denver. It is the owner of the great Castlewood dam, a stone dam 685 feet long and 80 feet high, forming a monster reservoir holding 250,000,000 cubic feet of water, irrigating thousands of acres of land, beginning at a point just outside the city limits and extending southward about twenty miles. The company was capitalized for \$2,500,000 and bonded for about half as much more. The panic of 1893, combined with palpable mismanagement, threw the property into the United States

courts, and Mr. Austin G. Gorham was appointed receiver in 1894. Under the able management of Mr. Gorham the property was conserved and improved, and finally in the month of June, this year, a reorganization was effected and the title passed to the new corporation, the Denver Land and Water Company, and Mr. Gorham was continued as general manager. In the strong hands of the new company the property is being greatly improved and large tracts of land are being placed upon the market. The selling methods are somewhat different to those of the usual land company as outlined on another page in this issue, and the results are being watched with interest. The process of squeezing out the wind and water in the stock of some companies will be directly beneficial, and the general tone of irrigation securities will hereafter be better sustained.

The Union Pacific Railroad. The reorganization of the Union Pacific Railway seems to be assured. The following telegram has just been received at the office of a prominent stock broker in Chicago: "It can be safely announced that the president and attorney-general have agreed to accept without further delay the Union Pacific reorganization committee's offer to buy that road under foreclosure. The attorney-general will take no appeal from the recent decision of the courts; the road will be sold, the government's mortgage satisfied and the Union Pacific reorganized soon after the president's return to Washington." The reorganization of this immense railroad system is of the greatest importance to a number of states, particularly Kansas, Nebraska, Colorado, Wyoming and Utah. If a liberal attitude toward the development of the resources of the states in which its main lines and principal branches are located, is adopted by the directors of the new company, it will result in the beginning of an immediate upbuilding of this vast territory. It cannot be definitely stated at this time

what changes if any are to be made in the officials at the heads of the various departments, but it is hoped and trusted that those who have rendered such efficient service in the past will be retained and allowed greater authority in the matter of putting into execution the ideas dictated by their experience. The history of the Union Pacific Railroad comprises chapters on national pride and individual corruption. From the first birth of an idea of a transcontinental railroad it was held to be a matter of national importance, and selfish men for their own personal gain set forth specious pleas for governmental assistance financially. Tremendous private fortunes were made on the construction of the road and its final sale on the first of November under the plan now proposed will mean a loss to the government of many millions of dollars. The history of this railroad from its first inception to the present receivership has been written and published in book form by John P. Davis, M. A., and it is a very entertaining and instructive narrative of a gigantic enterprise.

The Irrigation Convention.

As this issue of THE AGE goes to press there comes a telegraphic dispatch announcing the convening of the Sixth Annual Irrigation Convention. The irrigation enthusiasts have held annual conventions since 1892, when the first one met in Salt Lake City, Utah, on the call issued by William E. Smythe, formerly editor of this magazine. The one tangible result of these conventions has been the placing of the irrigation idea prominently before the public through the medium of the press, and in this way considerable interest has been aroused in the subject. The present convention is composed of some of the leading men of the western states, who have a direct and personal interest in irrigation, and it is hoped some good results will follow. The November number will contain a report of the convention proceedings.

THE NEED OF POPULATION IN THE WEST.

A SKETCH OF THE WONDERFUL REGION BEYOND THE MISSOURI, AND ITS POSSIBILITIES.

BY ARTHUR I. STREET.

Associate Editor of the Denver Times.

WATCH THEM COME.—The ranks of the investors with faces turned toward this Republic are swelling daily. —*Two Republics* (City of Mexico), May, 1897.

A novel colonization movement, having its headquarters in Chicago, has been started for the purpose of affording relief to the vast army of the unemployed in that and other cities of the United States. Why not induce this army of the unemployed to come to this country and set them at work developing its immense agricultural and mineral industries.—*Two Republics* (City of Mexico), May, 1897.

The constant inflow of letters from the United States to the *Two Republics* seeking information about the resources and chances for investment reveal the startling fact that most of them are from men who are the possessors of capital ranging from \$3,000 to \$6,000.—*Two Republics* (City of Mexico), April, 1897.

There's nothing 48-cent about the boom. —*Mexican Herald*, May, 1897.

If Mexican newspapers can be justified in writing such things as the above, and if they be Americans who are causing this non-48-cent boom, then either Americans do not know that they are needlessly going out of their own country in the pursuit of prosperity, or they are wilfully and deliberately disgusted with Uncle Sam and desire to leave him.

In the eighteen states comprising the territory west of the Missouri river there is a total area of nearly two million square miles that contains less than one-thirtieth

of the population it is capable of supporting. It has railroads, cities, state and county governments, schools and all the appurtenances of modern civilization awaiting the new resident, and appealing to his effort to enlarge and perfect them. The Indians who infested and made the West dangerous a generation ago have disappeared. The hardships, privation and barbarism encountered by the pioneers are virtually things of the past. Only one great difficulty lies before the western inhabitant. That difficulty is the problem of redeeming the arid lands by irrigation.

Massachusetts, containing only 8,000 square miles and a population of 2,238,000 individuals, has no more tillable land in proportion to its area than any one of the western states. In 1890 it had only 1,657,000 acres under cultivation, whereas California with 12,200,000 acres under cultivation had a population of less than half of that of Massachusetts. Colorado in the same year supported only 412,000 people upon a cultivated area of 1,823,000 acres, or nearly 200,000 acres more than were cultivated in Massachusetts.

California and Colorado are but representative of the other eighteen western states. On an improved area of nearly 125,000,000 acres they support an average of only one person for every thirteen acres, whereas Massachusetts has less than 80 per cent. of an acre for each person. No complaint has ever been made that Massachusetts is overcrowded, or if complaint has been made it is only since the un-

toward business conditions of 1893 were begun. Therefore it is fair to presume that the West can enlarge its population to 150,000,000 without being overcrowded. And that, too, with its present improved acreage.

The objection to this comprehensive figuring is that Massachusetts is largely a manufacturing state. That is the case now but it was not the case half a century ago; and half a century hence the West also may be a manufacturing center.

It is not the case in any section of the West that all the immediately tillable land

tion and lack of natural moisture, this insures room for as many inhabitants again as were estimated above.

In other words the eighteen states of the West can be filled with thirty times as many people as now inhabit them, and still not be overcrowded. That would give them practically the same average of population to the square mile as is possessed now by the states east of the Blue Ridge and north of the Mason and Dixon lines.

Probably no one factor causes the West so many economical and social difficulties



"HOW WE IRRIGATE."

has been improved. Thousands of acres in the coast states yet await the plow, and many thousands more in the arid states are under ditch but have not yet been put to service. But aside from the immediately tillable lands there are as much as 250,000,000 acres that can be brought under irrigation and be made thoroughly productive. Estimates of the number vary from 100,000,000 to 440,000,000, but the 250,000,000 is assumed by experts as a fair minimum. Allowing for all manner of disadvantages connected with irriga-

as the scattered nature of its habitation, its vast area and its limited population. This enforces upon its people and upon its institutions burdens vastly out of proportion to those borne in other sections of the United States. Its railroad mileage, its insurance tax, its real estate and farm mortgage, its cost of local government, and its expense of home support and local pleasure and recreation is greater for the individual citizen than in the eastern states.

EAST AND WEST COMPARED.

The railroad mileage of the four groups included in "the West" by the interstate commerce commission is 40,340 miles, whereas in the groups included in New England and the Middle States, with a population of 20,000,000 against 10,000,000 in the West, the aggregate is less than 20,000 miles. How great an inequality of burden this enforces is evident at a glance.

The inequality, of course, does not fall entirely upon the patrons of the railroads. A comparative statement of the earnings per mile shows that the owners of the roads have their share. In the New England and Middle States groups the gross earnings average about \$15,400 per mile; in the western groups they average only \$9,500 per mile.

Real estate mortgages to the amount of \$975,000,000 were reported as being in force in the western states in 1890. On these the annual interest charge was more than \$75,000,000. New York state, on the other hand, with a population of 5,000,000 to add to the value and productivity of property had only \$1,000,000,000 mortgages.

The total assessed valuation of property in the Trans-Missouri country approximated \$3,795,771,597 in 1890. In the same year the assessed valuation of the north Atlantic states was \$10,908,667,585. Relatively to the West this valuation was in the proportion of 10.3, whereas the population was in the vastly different proportion of 17.10. Upon the assessed valuation of the Trans-Missouri states the taxation aggregated almost \$8,3200,000, while in the north Atlantic states it was slightly over \$179,000,000.

In the Trans-Missouri states the city, county and state indebtedness amounted in 1890 to something over \$141,000,000 with an annual interest charge of \$7,700,000. In the north Atlantic states the debt was \$467,968,615, with annual interest charge of \$31,018,325.

Thus in the matter of taxation, indebt-

edness and annual interest charge the western states have the advantage. But the north Atlantic states have a total output of farm products and manufactured goods valued at \$5,315,052,616 with which to meet their taxes and interest, whereas the Trans-Missouri country has a total output of only \$1,359,403,102 with which to meet their taxes and interest.

Again, the north Atlantic states have in their banks \$427,657,388 on deposit, whereas the banks of the entire West and South muster only \$247,700,216, all told. In stocks and securities the eastern banks hold \$128,174,696 from which to draw interest, while the western and southern banks combined hold but \$28,845,068, or slightly more than one-fourth the amount held in the East.

All these figures have been changed more or less since 1890. Gubernatorial estimates place the total population of the Trans-Missouri states at 11,885,977, an increase of somewhat over 20 per cent. The same estimates raise the north Atlantic population about 16 per cent. It is allowable to estimate that the amount of production has increased accordingly.

Granting this, the situation with reference to population is very little altered. In the great West is a population of less than six to the square mile, while in the far East is a population of more than 125 to the square mile. In the states of the middle West is a population of nearly fifty-six to the mile, while in the southern states is a population of slightly less than forty to the mile.

With inhabitants only one twenty-fifth as densely located the West supports traffic carriers only one-half less in mileage than those of the East. At the same time it produces one-fourth as many commodities, pays one-fourth as much interest upon its indebtedness, and has property valued at only one-third that of the East.

Such an illogical arrangement can but suggest how great the opportunities for prosperous existence in the West are, and

how urgent is the need of populating it more densely.

ROOM FOR MORE.

If 9,000 square miles in Vermont will support 340,000 people, 84,000 square miles in Idaho certainly can be inhabited by several times the 150,000 people now dwelling there. Idaho is equally as fertile, no more mountainous, and equally as pleasant climatically.

If nearly 30,000 square miles in Maine will support 740,000 people, 66,000 square miles in Washington which has equally as great a sea coast will support twice as many as the 418,000 inhabitants it has at present.

If 45,000 square miles in Pennsylvania will support 5,785,625 people, 104,000 square miles in Colorado will support at least four times the 480,000 inhabitants it now contains; because Colorado has iron and coal in equal quantities with Pennsylvania, and has gold and silver and lead and copper and building stone in greater quantity than any state in the union.

If New York with 47,600 square miles can make a population of 6,827,200, thrifty California with its great seaport, its temperate climate and its multiple resources ought to be able to quadruple its population of 1,500,000 upon its enormous area of 108,300 square miles.

And thus the comparison might be continued.

Arizona in an area of 113,020 has a population of only 88,500, whereas it has mineral resources practically unlimited and 10,000,000 acres that can be irrigated from its flowing streams.

Montana almost exceeds any one of the balance of the western states in mineral output and has natural grasses so rich that thousands of cattle are sent there to feed on the vast ranges. Yet in the 146,080 square miles of the state there are but 205,000 inhabitants, while the agricultural resources of the rich grazing land are only now beginning to be tried.

Nevada is a huge inter-mountain basin of 110,700 square miles in area, with only

47,000 inhabitants. But it is no drier than were the other portions of the desert wherein the pioneers found their fortunes. That it is covered with gold and other minerals which have never been prospected is conceded by all who have given it even the most cursory examination.

New Mexico with only 225,000 people in 122,580 square miles is, like Arizona, rich in minerals and already rapidly developing in agriculture and horticulture.

The Dakotas are monstrous farms, with splendid mineral resources in the southwest, some of which have enticed ex-Gov. Pattison of Pennsylvania and a company of wealthy associates into them. They contain 150,000 square miles with only 595,000 inhabitants.

Texas with the great seaports of Galveston and Port Arthur gets only eleven people into each of its 265,780 square miles; while Utah wherein the Mormons have farmed themselves wealthy and the Gentiles have mined themselves more wealthy still, there are but 261,222 people in a total area of 89,740 square miles.

On the crest of the continent is Wyoming, with a strange abundance and conglomeration of minerals and stone, and with water facilities unlimited, possessing only 76,000 people in its area of 97,890 square miles.

Thus the entire western population could be distributed with one person at the corner of each square mile and one in the center of the square—a distribution which would be as lonesome for each individual as being lost in a desert or as traveling alone in a country which speaks an unknown tongue. It would scarcely allow for the placing of a head of a family in the center of the mile and one of the balance of the family on each corner.

Or, to compute it another way: If there are 125,000,000 acres of land already improved and 200,000,000 acres of land awaiting improvement, there are just thirty acres, plus, for every man, woman and child to cultivate. And where is the

man, woman or child who can single-handed cultivate thirty acres?

Manifestly there is room for farmers and there is need for farmers in the West. There is room for them to make homes for themselves. There is need for them to build up the communities, to improve the prosperity of existing institutions, to make markets for manufactories, to increase avenues of employment, in short to lay the foundation for general community advancement. The West is ready to receive the immigrants "with \$3,000 and \$6,000" who are said to be moving to Mexico. It has abundant room for the colonization scheme of the laboring men of Chicago. Its non-48-cent boom days have not entirely vanished.

OPPORTUNITIES FOR INDUSTRY.

Aside from the farmers who may get their living out of the soil there are opportunities for the tradesmen and craftsmen who have funds enough to inaugurate small manufacturing enterprises, enterprises calculated at first only to supply home demands. (There is no room at present for large ventures). There is room for men who will promote unpretentious traffic accommodations, short lines of railroads into the rural and mining districts. Such undertakings will create employment for surveyors who can be modest enough to begin on something less than surveying a tunnel through Pike's Peak or running a sky line from Chicago to Yellowstone Park or Mt. St. Elias.

There is room for irrigation engineers, men who first will master the small problems of their home districts before seeking to dam up the Rio Grande or divert the channel of the Columbia.

There is room for young statesmen who will begin by being county men or city men before insisting upon going to the United States Senate.

There is room for mining prospectors, men who have the hardihood and a little of the wherewithal that the men of '49 and '58 had; men who are not afraid to venture into the unexplored deserts of

Nevada or the dry mountains of Arizona, and who will stay there until they find what they seek. There is no room for "grub-stakers" who expect others to support them.

There is room for students of mineralogy who will not insist upon contradicting the judgment of men of experience, but who will learn from nature as readily and eagerly as they have learned from books and cabinets.

Then when you have passed over into the grander phases of human occupation the West still offers inducements as inspiring to the imagination as the conquest of continent or the discoveries of consolidated Virginias.

Of this, Cripple Creek is an instance. Fabulous wealth was found where live stock had grazed; but only a few of the thousands of prospectors were rewarded with fortune: a lottery the good or ill of which the fortune seeker must have the courage to accept without complaint.

Cripple Creek is being duplicated in Randsburg, California, and in Kootenai, just across the border of Washington. It may be duplicated at Yuma, Arizona, at Grand Encampment in Wyoming, at Hahn's Peak, in Colorado, at Gold Creek near Elko, Nevada, or at any one of hundreds of new gold camps in any one of the Rocky Mountain or Sierra Nevada or Cascade Range states.

Again the man who may invent a new mineral treatment, such as the cyanide and concentration processes may revolutionize a mining industry, or bring into value tons of low grade ore which hitherto has been thrown away as useless.

In the same manner inventive genius may discover a means of perfecting the scheme of "dry farming" whereby many arid acres as yet inaccessible to irrigation are already being made fruitful without irrigation.

Or inventive and engineering skill may devote itself for a generation yet to come to the problem of impounding and dis-

tributing the abundant waters of the mountains over the parched and desert plains. Some imaginative New Yorker has suggested a vast scheme of canalizing the entire West. This may prove less of a dream than a wise possibility in the future. It may lead to the salvation of Mississippi from its destructive and uncontrollable floods.

All of which but brings to mind that the man or the men whose magnitude of mind can conceive a plan or plans vast enough to handle the Mississippi problem can find in the West a task more sure to lead to enduring fame than the successful rail roading of the mountains and the deserts in the decade from 1860 to 1870.

The water courses of the West have never been made serviceable to commerce or industry to any considerable extent; yet the Columbia offers the same possibilities as the Ohio, and the precipitous streams of the Rockies are almost as full of electric power as the falls of Niagara.

The coasts and ports of the Pacific and the Gulf of Mexico are new to commerce comparatively, but the Gulf is already wresting traffic from the Atlantic and

from the great lakes, and San Francisco is superseding New York as a distributing point for Asiatic tea and spices, while Puget Sound cannot furnish ships enough to carry the grain that is moving from Western America to the Orient.

Where ocean commerce is, there business is, and there, too, is place for increased population.

For the men who love adventure the opportunities of the western mountains are only less than those of the Andes and more extended and diversified than those of the Alps.

And so on through the ramifications of the occupations, pleasures and vicissitudes of an independent and newly-founded empire, run the inducements of the West for new population. The resources are as yet only half discovered; only one-thirtieth developed. The monetary possibilities have been merely prospected, and the experience of railroads and all the big industries but prove how much more rich and profitable any of them might be if the West contained thirty, forty or fifty million of people where now it contains but ten million.



HOME OF JAMES M. WELLS, PLYMOUTH COLONY, IDAHO.

THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs. Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill-irrigation plant is always interesting. Will you help us improve the the appearance of THE AGE?

ELECTRICITY ON THE FARM.

IT is reported that there has been recently invented in San Francisco an electric storage battery which promises a revolution in the methods of using electrical power. Hitherto the storage battery has not proven an unqualified success, and the prophecies of its early universal use have not been fulfilled. The great weight and expense of those heretofore generally in use have precluded their use except under unfavorable conditions, hence the dreams of storage battery enthusiasts have thus far proven illusory. Now, however, if what is alleged to be "inside information" can be relied upon, there is already in existence the appliance that will astonish the world by its feats in the field of applied electricity.

For various business reasons the perfecting processes whereby the new appliance has been at last fully evolved, have been kept secret, and even the name of the inventor is not yet to be spoken in the public prints. A well informed correspondent of THE IRRIGATION AGE however has seen enough of the workings of the wonderful device to convince him that the claims made for it are not impossible of fulfillment. The actual cost of the battery is said to be less than \$5.00 and the weight less than 30 pounds, and the apparently impossible claim is made that in such a battery electricity enough can be stored to run a 20 horse power engine ten hours. The writer is not able to state of his own knowledge that this is true, but he has been so informed by a reputable

gentleman who has witnessed its performance. If we assume that this remarkable invention can accomplish even a small part of what is positively asserted of it by eye-witnesses of its work, then there lies herein much encouragement for the farmer. It short it portends a marked change in farm appliances and farm methods.

Whenever a farmer may store electrical power as he stores water in a tank or wheat in a bin, the time is not far away when a thousand items of farm drudgery will disappear and an entire new set of easier conditions will take their place. Whenever electricity shall have taken the place of the farmer's son as "chore boy," there will be abundant occasion to rejoice. When the churning, the wood splitting, the hay lifting, the corn shelling and grinding, the water pumping, the posthole digging, the stable cleaning, the dinner cooking, the house lighting and dish washing become mainly the mere matter of pressing a button, farmers, farmers' wives, and even the hired man may properly believe their millennium has come. But all this now appears to be possible within a short time, and there are highly intelligent men who assert that it is not only possible in the near future, but is already a practical fact.

No doubt a few months will be required to put the plans of the inventor in operation, even supposing that his invention will accomplish all he proclaims regarding it; but if the farmer is at last to be put within easy range of a cheap and convenient power for the manifold uses to which it

may be applied, agriculture will acquire a new dignity and those devoted to the oldest of human occupations will have reason to bless the Patent Office. It is alleged that the new invention has been subjected to the severest tests, and that the marvelous results it has shown have caused a stampede of capitalists in the direction of the humble inventor's workshop. At this

writing no notice of this invention has appeared in the press, and THE IRRIGATION AGE congratulates itself on being the first to proclaim to the farmers the probability of an early lightening of their labors and an increase of their profits through the medium of a cheap and efficient storage battery.



SAGE BRUSH PLAINS READY FOR THE SETTLER.

CALIFORNIA OLIVE OIL GAINING FAVOR.

THE *Grocery World*, of Philadelphia, has the following to say about California olive oil:

"California olive oil is slowly growing in favor among the Eastern American trade, although the increase is not rapid. It continues to bring prices which compare very favorably with those brought by foreign oils when bottled by the producers under distinctive labels.

Olive oil, while in the main used in the preparation of salads, is coming into gradual use for general cooking purposes. It can be heated to a much higher degree than butter and this is an advantage which housewives much appreciate. In many cases it also increases the flavor of dishes in the cooking of which it has been used.

There is no doubt because of these advantages, that if some enterprising wholesale grocer or manufacturer were to devise some means whereby olive oil could be put on the market in some sort of a comparison with the ordinary frying products, such as lard, butter, etc., he would have an exceedingly remunerative article."

We may say to our hopeful contemporary that it will not be possible, within any reasonable time at least, for the pure olive oil of California to compete in price per pound or per gallon with lard or probably with butter. As a better article for culinary use than either butter or lard, it should sell at a much higher price, and must continue to do so until the supply becomes many times greater than now. Some of our Eastern friends make the mistake of comparing the pure oil of Cali-

fornia with the so-called olive oil largely imported from Italy and other European countries. But this latter stuff is, generally speaking, not olive oil, but a mixture of an insignificant amount of olive oil with a large amount of peanut oil, cottonseed oil, lard oil, mules fat or what not. There is no possible comparison between the two, any more than between the pure clarets of California and the decoctions of logwood and cheap alcohol sold to our unsuspecting friend in the far Eastern States as "Choice French Claret." And in this connection it would be well for those seeking pure foods to note the fact that in our own country hog fat does not grow upon the olive tree nor logwood upon the grape vine.

NOTES.

A few tobacco growers who are interested in finding out whether or not Havana leaf such as raised in Cuba can be produced in the United States, have formed an organization known as the "Cuban Tobacco Growers' Company" and for the past eighteen months have been making experiments. Forty acres of land was selected at Fort Meade, Fla., and a system of irrigation used, by which piping was laid underground, and provided every 125 feet with a spray head. A large Dean pump, with a capacity of 20,000 gallons per minute furnished the water. The yield of tobacco was 35,000 pounds for the forty acres, and although until it is cured it cannot be claimed that the plant is a perfect substitute for the Havana leaf, the growers have certainly proved what irrigation will do, as without its use such a large yield would have been impossible.

Frederick G. Coville, botanist of the department of agriculture, has made quite a study of so-called "weeds" and has discovered that many of them are fit food for man. The long-despised "pig-weed" or "goose-foot," he claims belongs to the same family as the beet and spinach and with them is entitled to a place on our

table. Wild mustard or charlock, which is considered poisonous, is said to have been used as a pot-herb in northern Europe many years ago. Of course the cowslip and dandelion are well-known as edibles, but we have never thought of the leaves of the chickory and dock in that light. Pokeweed is used in some parts of the south, and the department thinks that in time milk weed, common nettle and round mallow will be regarded a good food.

John Brady, the recently appointed governor of Alaska, was one of a number of street arabs sent to Indiana thirty years ago by a children's aid society of New York. He is said to have been the most unprepossessing one of the lot, but had the good fortune to be taken by a kind hearted judge, who gave him every advantage.

The Kansas farmer is raising something this fall besides wheat and corn, and that is mortgages. It is said that one enthusiastic farmer, in telling of the marvelous growth in Kansas, pointed to a hill saying: "Talk about growing. See that hill? Well, when I kim here that hill was a hole in the ground."

People who have long regarded the red ant as a pest to be gotten rid of will be surprised to hear that they are the fruit growers best friend. An Arkansas fruit grower who talked of shipping red ants to that state was the first to bring the matter up, and since then the horticulturists have been investigating the matter. It is claimed that the ants destroy the worms among the trees and that the woolly aphis, an apple tree pest, is a chief article of diet with them. It is said that the orchards in the vicinity of Delta, Colo., are full of red ants and that this accounts for the fact of the trees being in such good condition and free from worms. One prominent fruit grower goes so far as to say that the fruit crop in the state of Colorado would be a failure if the red ants were all destroyed.

According to some of the western pa-

pers horses are again in demand and prices are accordingly going up. For the past few years horses have been so cheap that it has not paid to raise them and many dealers ceased to do so. Now, however, that the farmers are having such good crops they begin to feel that they can afford a new team, and work horses are therefore in demand.

Georgia farmers are soon to have an opportunity of seeing corn-stalk hay. The Georgia commissioner of agriculture says that good feed for horses and cattle can be made from cornstalks, by subjecting them to a machine which shreds the stalks, making a soft, easily masticated hay which is much more acceptable to the cattle and horses than cottonseed hulls, and is also more nutritious.

The potato crop this year will be much smaller than was anticipated at the beginning of the season. July proved to be very bad indeed and the yield will therefore be comparatively low, with prices correspondingly high.

The hay crop this year from the country near St. Louis is very large. There will probably be an increase of 3,500 carloads more than last year's crop.

From every section of the country comes the joyful news of prosperity. From New England to California, from Texas to the northern border come the universal shout of increased good times. Magazines and exchanges, whether published in the interest of agriculture, mining or commerce, without regard to their political faith unite in proclaiming the glad tidings. As one man wisely remarks: "It is sufficient for the business men and farmers of this country to know that prosperity is here without politicians undertaking to explain the whys and wherefores." Probably in the "hard times" which we have recently undergone we have learned lessons in economy that were never known to us heretofore and which will not soon be forgotten.



HOME OF A FRUIT GROWER.

PULSE OF THE IRRIGATION INDUSTRY.

VALUABLE SUGGESTIONS ON GOOD ROADS.

BY FRANK S. CHAPIN.

EMMET BARBER, C. E., engaged on the irrigation work of Miller & Lux, Kern Co., Cal., reports that they are checking up some 5,000 acres every year. Their system is similar to that described by T. S. Van Dyke in his article descriptive of Kern County Land Co., in THE AGE for June, 1896.

They have made some recent changes in detail. They have been accustomed to use very large checks and to run water from one to another, then into the large drainage canal that spreads over the swamps and makes late feed there. On this plan they only irrigated by day and allowed a great deal of water to run to waste and some to stand too long on the land. Sometimes they threw checks around the low places to prevent their filling and at other times they let them fill up and make ponds.

Now they are renewing cross ditches from their canals along the highest ridges and allowing the lowest ground between every two for a drainage canal. All these drains empty into the main drainage canal that runs to the swamp.

Instead of allowing the low places to become ponds they make low checks of these and only let in enough water to irrigate them.

They are making much smaller checks than formerly and expect to work a night crew as well as one by day, and extend the service of water greatly by admitting to such checks only enough for a thorough wetting, and draining into another drain instead of another check, whenever it is practical.

This will be a great improvement in avoiding injury to the alfalfa in hot weather and will not pack the ground as is sometimes done when water stands too long.

The implement described by Mr. Van Dyke for throwing up checks originated with Miller & Lux and was adopted by the Kern County Land Co. It consists of a heavy plow and fine large discs attached to a heavy Stockton gang plow frame. The outer disc is hinged so as to be thrown out of the way until the last round when it is needed to finish up with.

It is drawn by eight mules and operated by the teamster.

A day's work is one and one-fourth miles of check, sixteen feet at the base and two feet high in the center. In making so many trips over the ground the eight mules pack it sufficiently.

They call this implement a "Hone" and it costs them about \$70.00.

Here is a valuable suggestion for those interest in "Good Roads". If there is any implement or combination that will throw up half the grade in the same time, with the same help, the writer has never seen it demonstrated. All through this country a grade sixteen feet wide at the base and two feet high in the center is exactly what we want for a foundation for our roads, and it would make a good start for a railroad grade. We shall hear more of the "Hone."

WINDMILL IRRIGATION.



DURING the past few years the value of windmills for raising water for irrigation has been clearly demonstrated, and they are now in quite general use for this work in many localities. Up to the present time practically all of the windmills have been for pumping service only, and could not be used for any of the many other purposes to which wind power is adapted.

The Goodhue windmills have long bene

well known, and it will interest our readers to learn that the Goodhue 13-foot steel power mill is not only especially adapted to irrigation, but will also do a very large amount of work, running various kinds of machinery, including grinding mills for grinding feed, making fine meal and graham flour, shelling corn, sawing wood, and other work of this class.

This power mill will do as much work pumping as is done by ordinary pumping mills of much larger size and during the winter and at other times of the year when not used for pumping it will do enough work for grinding to soon pay the entire cost of the outfit, thus doubling its value at very little increased cost. In durability they surpass any other type of mill, and are so simple in construction that anyone can erect complete equipments perfectly. These mills are made by the Appleton Manufacturing Company, of Batavia, Ill., who manufacture a full line of windmills for all kinds of work, and are the largest makers of iron grinding mills in the world, and also make an extensive line of other machines that are used in preparing feed for stock.

MINING NEWS.

The output of gold from Baker County, Oregon, will this year reach \$2,000,000.

Numerous gold fields are being reported from the state of Utah. From a mineral standpoint this state is practically unexplored. Several of its silver mines have had to suspend work owing to low silver, and in the large silver producing states, Colorado, Washington Montana and Idaho, the silver output has declined owing to the fall in price of that metal. Copper, petroleum, gold and aluminum have increased in product and in value. According to government figures lead shows a decline but there is an increase in the total amount mined.

The gold product of Colorado this year will exceed \$20,000,000.

One ounce of silver was worth a bushel of wheat last year, now it takes two ounces of silver.

A valuable bed of white clay, containing almost 16.5 per cent of pure aluminum was recently discovered at the north end of Christina lake, in British Columbia. The discovery was made quite accidentally by four men who were prospecting for mineral veins. The bed has been traced for a distance of 1,300 feet on the surface and is about 12 feet in depth. According to assays it will be equal to \$185 per ton in pure aluminum.

The *Western Mining World* advises the reopening of abandoned mines, claiming that in many instances they were given up without sufficient cause. This advice was followed in the case of an old mine in California, which was purchased for \$400 and in two weeks yielded \$42,000.

Gold at Home.—A Washington paper is of the opinion that the people of that state should turn their attention to booming the gold fields in their own vicinity instead of giving so much newspaper comment to Klondyke "fairy tales." According to the western press there is a vast amount of gold right at home that can be obtained without undergoing the danger of cold and starvation which attend the Klondyke gold fields. The *Semi-Weekly Standard* of Ogden, Utah, of recent date, reports the finding of gold in the streets of Edgemont, S. D., while excavating for a sewer. It is claimed a man can obtain about \$20 worth of gold a day from this. Copper River is also said to be rich in gold, while well authenticated reports come from Loomis, Wash., of a gold-bearing quartz ledge which has been struck in Palmer Mountain tunnel, and which it is confidentially hoped will make Loomis a great mining camp. The first lot of quartz brought down from this mine and assayed showed \$2.50 silver and \$187.70 gold. The upper peninsula also claims to possess a large gold field. All of which goes to prove that the Klondyke is "not the only pebble on the beach."

IN THE REGION OF THE ROCKIES.

TO adequately portray the scenery, resources, climate and possibilities of Colorado would be an impossible task for any one person. A few of the more prominent points only will be touched upon here.

Colorado is situated between latitude 37° and 41° north, and longitude 102° and 109° west. It is bounded on the north by Wyoming and Nebraska, on the east by Nebraska and Kansas, on the south by Indian Territory and New Mexico, and on the west by Utah. The state has an area of 104,500 square miles, and is divided into forty-two counties: Its average length, east and west, is 380 miles, and its breadth, north and south, 280 miles. That their readers might realize in some degree the vast extent of this area, it has been frequently stated by writers in descriptive accounts of Colorado that it is larger than all the New England States combined, with the State of Ohio added; it is larger than the four Middle States, and larger than England, Scotland and Wales combined.

Colorado has two natural divisions—mountains and plains. To the mountains belong the foothills and the system of great natural parks—North, South and Middle Park. The broad mesas and extensive valleys of the western slope are also included in the mountain division. Over one-third of the eastern part of the state is plains, the western portion containing an area of 230x280 square miles, being principally mountainous.

The plains are generally level and arid broken only by the depressions which form the natural drainage of this vast expanse of treeless land. These become actual and sometimes exceedingly vigorous water courses in rainy seasons and they are dignified with the names of creeks and rivers.

Starting from the foothill in El Paso County and running through El Paso and

a portion of Bent County eastward to the Kansas state line is a range of hills known as the "Divide." It serves the purpose of dividing the eastern, or plains portion, of the state in the center. It is partly covered with valuable timber and comprises rich agricultural lands. From the summit of this range the waters flow northward toward the Platte river and on the south toward the Arkansas; the summit of this Divide is about half way between Denver and Colorado Springs.

To the mountains belong physical features of varied and peculiar interest. The Continental Range crosses the state nearly north and south, near its center. Here the Rocky Mountains attain their greatest elevation—200 peaks nearly 13,000 feet high, and about twenty-five peaks from 14,000 to 14,400 feet high being visible from Mount Lincoln. Between latitudes $30^{\circ} 30'$ and $40^{\circ} 30'$, which is nearly the central portion of the state, the chain is about one hundred and twenty miles broad, consisting of three parallel ranges running nearly north-northwest. The east one, called the Front, or Colorado Range, as seen from Denver, appears to rise abruptly from the plains, stretching with snow-clad summits from Pike's Peak on the south to a group twenty miles north of Long's Peak, a distance of 120 miles. Six of its peaks—Long's Peak, Mount Torrey, Gray's Peak, Mount Rosalie, Mount Evans and Pike's Peak—are from 14,000 to 14,340 feet high, the latter altitude belonging to Mount Rosalie.

CLIMATE AND HEALTH.

The superiority of Colorado climate for all lung diseases has long been recognized in the scientific world, and the state has become the Mecca of consumptives. In all countries, high altitudes and dry atmosphere are the healthy places for residences. The purity and peculiar qualities of the atmosphere is the main reason ascribed. One important reason is the increase of the breathing capacity by the rarefied air, the expansion of the chest, and the power of the muscles used in res-

piration. Standard medical authorities give abundant reasons why the rarefied air of high altitudes is efficacious in the arrest and cure of pulmonary diseases, and there are thousands of individual experiences in Colorado today which confirm their theories. In an exhaustive discussion of this subject an eminent physician of Denver, who has devoted his professional life mainly to this study, illustrates his argument by showing the climatic or physical causes of purity of atmosphere, as well as by the evidence of experience. The relative attributes are presented as follows:—

Dryness, as opposed to moisture.

Coolness or cold, preferable to warmth or heat.

Rarefaction, as opposed to sea level pressure.

Sunshine as opposed to cloudiness.

Variability of temperature, as opposed to equability.

Marked diathermacy of the air, to be preferred to the smoky atmosphere of cities or the dense air strata of moist currents.

Radiation and absorption of heat by rocks and sandy loams, better than latent absorption.

Mountainous transfiguration, contrasted with flatness of level sections.

Frequent electrical changes of atmosphere, also moderate winds (except in quite cold weather), preferable to continuous stillness of air.

Inland altitudes, contrasted with sea air.

Without presenting the arguments and technicalities of a tedious scientific discussion, it is sufficient to show conclusively that in Colorado all the conditions of health are met. There is a sufficient altitude to cause lung and chest development; there is dry, exhilarating mountain air, with an almost absolute absence of malaria; there is the tonic effect of a bracing climate without its rigors; an atmosphere filled with ozone; cool night in summer; a bright, sunny sky almost every day in the year, conducive of cheerfulness, and

bringing a new pleasure every morning. It naturally follows from these conditions that both mind and body are constantly stimulated in their functions.

AGRICULTURAL PRODUCTS.

The products of field and farm and orchard and vineyard cover everything grown in the temperate zone except cotton, rice, oranges and lemons. The soil and climate of the state is adapted to all fruits, vegetables, grains and grasses. Everything from the most luscious peaches to alfalfa grows to perfection. Considerable attention is being given the dairy and poultry industries, especially in the vicinity of Denver. There are great opportunities in these lines for wide awake, intelligent, money making people.

FRUITS AND FRUIT GROWING.

The first experiment in fruit growing in Colorado began thirty-one years ago, in 1863, when William Lee, of Jefferson County, the pioneer fruit culturist of the state hauled his first stock of trees by mule team from Iowa City, Iowa. Fruit growing has become a permanent industry. Its success is already established and it gives promise of still greater profits in the future. There are two main points to be observed. All fruits of the zone (except some of the more tender varieties of the stone fruits) are exceedingly well adapted to the soil and climate of the eastern side of the mountains. Their culture has been very successful except far out upon the plains, the nearer the mountains the better grapes and other small fruits grow. All fruits, including peaches, grow successfully on the west side of the mountains. Everywhere apples form the staple fruit crop and they grow large and luscious, including all choice varieties. The fruits most abundantly raised are apples, pears, plums, peaches, apricots, strawberries, cherries, raspberries, blackberries, gooseberries and currants. The most prolific as well as the most luscious of all tender fruits is the strawberry. For size, sweetness, excellence of flavor and abundance of growth,

it is not surpassed in the world. A yield of 3000 to 6000 quarts per acre is not uncommon. From one small valley in the vicinity of Denver over \$100,000 worth of strawberries were marketed this last season at highly profitable prices.

The scenery of Colorado is most wonderful, the climate both healthful and delightful, the soil exceedingly fertile and the mountains a very storehouse of richest minerals. A combination of great natural wealth unsurpassed anywhere. The inhabitants are broad and liberal minded people whose energy and activity is as immeasurable as their own mighty mountains.

COLORADO CONDENSED.

It is 21 years old as a state.

Its area is 104,500 square miles.

It is located in the great Rocky Mountain region of the West.

It is the leading mining state in the Union.

It is a great stock producer.

It is one of the finest agricultural states in the West.

It has the most agreeable climate to be found on the continent.

It is a vast health resort, the climate in every part being beneficial to invalids, especially those affected with lung diseases.

The soils are everywhere rich, and successful farming is carried on upon the plains wherever water can be obtained, and in the mountain valleys at an altitude of 8,000 feet.

The timbers growing on the mountains are abundant, and comprise the varieties that are useful in building,

Colorado has all the natural resources, water-power and capabilities for extensive manufacturing.

Colorado is the center of the great wool-growing West.

Colorado is abundantly supplied with natural parks, water courses and mineral springs of the finest medicinal qualities.

Petroleum is found in all parts of the state.

The coal strata underlying Colorado is

estimated at an area of 40,000 square miles.

All kinds of fruits grow successfully in Colorado, and orchards and vineyards are found in all agricultural sections.

Eight trunk lines of railway, with their numerous branches, traverse the state.

The average number of cloudy days in Colorado is fifty-six a year.

All the cereals and vegetables grow abundantly in Colorado.

Wheat, alfalfa and potatoes are the most profitable as well as the most prolific products.

The deepest hole in the earth, says an exchange, is the 4,900 foot shaft in a copper mine in the upper peninsula of Michigan. As the rock at the bottom is worth \$8 a ton, the hole will be continued indefinitely, much to the delight of geologists and other scientists.

A large find of copper has recently been made on an island of Prince William Sound, near Montague Island. The lead is said to be 300 or 400 feet wide, with 1,000,000 tons of copper in sight.

The Anaconda (Mont.) copper mines give employment under ground to 3,000 men whose daily wages amount to \$10,500. The yield of copper is from 10,000,000 to 12,000,000 pounds per month.

CHEAP RATES TO ARKANSAS AND TEXAS.

On Oct. 5th and 19th, Nov. 2nd and 16th, Dec. 7th and 21st, the Cotton Belt Route will sell round trip tickets from St. Louis, Cairo and Memphis, to all points in Louisiana, Arkansas and Texas, at one fare for the round trip, plus \$2.00. This is an excellent opportunity for homeseekers to secure a good location. For full particulars as to rates, etc., and free copies of handsomely illustrated pamphlets regarding the Great Southwest, write to E. W. LaBeaume, G. P. & T. A., St. Louis, Mo.

RESOLUTIONS PASSED UNANIMOUSLY AT FIRST NATIONAL HOMESEEEKERS' CONVENTION, CHICAGO, SEPT.

21, 1897.

Resolved by the National Homeseekers' Association in annual convention assembled that we advocate the turning of a tide of immigration on to these unused, unoccupied, fertile agricultural lands, believing that in this manner hundreds of thousands of people will become homeowners, independent and prosperous. And be it further

Resolved, That we advocate the passage by the various state legislatures of wise laws tending to encourage immigration, agricultural development and the establishment of manufactories and industries. And be it further

Resolved, That we advocate the session of all the vacant public land, by the United States Congress, to the states and territories in severalty, so that the same may be opened to settlement under such wise laws and regulations as will confer upon actual residents the greatest benefits. And be further

Resolved, That it is the duty of the national government to make suitable appropriations for the construction of reservoirs and other irrigation works in the arid West, thereby benefiting the West and the Northwest and preventing overflows in the Mississippi valley. And be it further

Resolved, That the National Homeseekers' Association invites the co-operation of labor organizations and other associations and individuals having the welfare of the nation at heart.

Resolved, That an executive committee, composed of one member representing each state and territory in the union, be elected to have control and carry on the work of the Homeseekers' Association during the intervals between the annual meetings. And be it further

Resolved, That it shall be the duty of

the executive committee to elect a president or chairman, vice-president or vice-chairman, treasurer and secretary who shall be known as the national officers. And be it further

Resolved, That it shall be the duty of each member of the executive committee to appoint four representatives from his own state or territory to be known as the State Homeseekers' Association, prefixing the name of the state or territory, and the member of the executive committee shall be the chairman or president of such state association. And be it further

Resolved, That if at any annual convention any state or territory is not represented, the governor of such state or territory be authorized to appoint some suitable person as member of the executive committee.

Resolved, That we favor the enactment by the states of more simple and perfect laws to facilitate the transfer of land ownership. And be it further

Resolved, That we commend the action of Secretary Wilson in his efforts to secure seeds and plants from abroad adapted to the climatic conditions of our various states, and that we further recommend the wisdom of creating a bureau in the agricultural department for the further development of this important movement. Also that we encourage every effort of the state and national government to promote the study of agriculture and agricultural experimentation in our several public school systems.

Resolved, That we favor forest preservation under the federal authorities, and we favor the segregation of such forest areas as will tend to a better and more complete conservation of the storm waters only after proper surveys of such areas have been made by competent engineers.

A New Principle in Pumping

The Seaman Patent Pump

Took first premium at the ST. JOSEPH FAIR, 1895.

It is simple in construction and easy to run, requires less power than any other pump made.

Will raise from 80 to 20,000 gallons of water per minute, from 5 to 90 feet, at a very low expense. Full particulars mailed on application.

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Arkansas and Texas

are the two states which are attracting more attention today than any other state in the union. The tide of immigration has been set in this direction for a number of years now, and people are pouring into these states by the thousands. The land is the finest, the climate the most healthful and the opportunities for making a living the most abundant. If you want to know all about these states write for free copy of the following handsomely illustrated pamphlets issued by the

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THE IRRIGATION AGE.

VOL. XII.

CHICAGO, NOVEMBER, 1897.

NO. 2.

THE PROGRESS OF WESTERN AMERICA.

**New
Management
New Price.**

The changes in the management and plans of THE IRRIGATION AGE were made so suddenly and the necessity of issuing a magazine on the first of the month precluded the possibility of making an announcement in the October issue. The new arrangement went into effect however with that number. Mr. James E. Forrest, an experienced newspaper man, has assumed complete control of the business management of THE AGE. The editorial department remains in the charge of George E. Girling as Editor in Chief with a full corps of assistants. The magazine will be enlarged from time to time as necessities require. The various departments devoted to practical agriculture by irrigation, news of the development of the industry, and other feature will be as complete as human ability can make them. Leading articles from the foremost men interested in irrigation will appear in every number. The editor's department, the Progress of Western America, will be a monthly reflection of irrigation and allied interests.

Each number of THE AGE will be carefully illustrated.

INCREASE IN PRICE.

Beginning with January 1st, 1898, the subscription price of THE IRRIGATION AGE will be \$1.50 a year. This is an increase of fifty cents over the present price and is fully warranted by the im-

provement in the size and contents and appearance of the magazine.

SPECIAL ANNOUNCEMENT.

Although the price will be increased January first those who subscribe previous to that date can do so at the present extremely low rate of One Dollar a Year. This offer is made in order to give our present subscribers an opportunity to renew and it will also apply on all new subscriptions sent in before December 31st, 1897.

To all new subscribers whose names are entered during November, the December issue will be mailed *free* and they will thus receive thirteen numbers for One Dollar, whereas if the subscriptions are not received until January the cost will be \$1.50 for twelve issues. Liberal inducements offered clubs of five or ten. Write for terms at once and organize a club.

**The
Irrigation
Congress.**

The closing days of the month of September witnessed the sessions of the Sixth National Irrigation Congress in Lincoln, Neb. To those who have intelligently followed the birth and growth of irrigation sentiment this last Congress was disappointing in many ways. In the natural sequence of events a movement of a popular nature should, with the lapse of time, gain strength in leadership, in the numbers of its followers and in the estimation of those who are openly

opposed to it as well as those who at first are disinclined to declare themselves. Such has been the history of irrigation sentiment and feeling, but it is far from being true of the organized irrigation movement or propaganda. The national organization (which could hardly be considered national in any respect, since it represented neither real irrigation sentiment and thought, or the states where irrigation is most largely practiced) had drifted from its moorings and was tossed on a sea of political aspirations, and it failed to inspire confidence in the public. A strong under-current of petty jealousy and selfishness had been engendered. The growth and welfare of the movement was sacrificed to the arts of the politician, and the chasm between the real friends of irrigation and the self-constituted representatives grew rapidly wider. Sectionalism played an important part. The West, as a whole, no longer worked in harmony; unity of purpose and effort was abandoned. The Northwest and the Southwest were pitted against each other. The calling of rival conventions and the organization of rival national bodies was discussed, but wiser counsel prevailed. In the meantime the influence of the congress was waning, no longer was it considered representative of the irrigation industry. Those who were directly interested in irrigation cared but little what the congress might or might not do, and the general public cared nothing. The recent congress was the culmination of the spirit of sectionalism and personal aggrandisement—and the recent congress was a failure.

Political Aspirations to Blame.

The truth is sometimes bitter and often distasteful, but the surgeon's knife may save the patient's life. No cause can hope to be successful or to exert any enduring influence or attain any prominence which does not inspire the confidence of the people. Without public confidence and popular approval, defeat is sure. A common purpose is what binds the followers of any movement together, and while this common purpose

endured the work of the Irrigation Congress progressed rapidly—not always harmoniously—there were differences as to the means, but not the end, to be accomplished. But when in a most amazing flight of Kansas oratory the real end and aim and purpose of irrigation was left far in the background, that political aspirations might usurp its place, the decline in popular interest and approval was marked and rapid. The Lincoln congress accomplished one great work in spite of the lack of attendance and interest. With a dismal creaking of its rusty joints the Car of Irrigation Progress was once more placed upon the track, and then as a local newspaper says, "the convention adjourned rather suddenly and informally."

The Resolutions.

The resolutions passed by the congress were of rather a non-committal character, but they showed a tendency to move in the right direction. Their principal features were: in favor of forest preservation by memorializing the president to withdraw from entry or sale all public lands more valuable for timber than agriculture or minerals after a proper and adequate form of administration shall be provided. Nothing whatever was said as to what would be a proper and adequate form of administration nor how the forests were to be protected from timber thieves after their withdrawal any more than they are protected now, and every one with a knowledge of western conditions knows that at the present time they are not protected. Another resolution favors the creation by Congress of a Public Land Commission "of skilled and experienced persons to investigate the conditions now existing and to submit to Congress such changes in our land laws as their investigations shall show to be desirable." The only probable effect of the creation of this commission, should the United States Congress so decide, would be to place in a new department portions of the work now being done by the General Land Office, the Geological Survey and the Irrigation Bureau. A spirited discussion was aroused over the



EX-SENATOR J. M. CAREY, OF WYOMING.
President Irrigation Congress.

resolution favoring the governmental construction of the reservoirs which have been located in Colorado and Wyoming by the engineer corps, but it finally passed. A fitting rebuke was given to the proposition endorsing the Booth-Tucker plan of colonization, and as finally passed, the resolution favors colonization enterprises in general and not one plan in particular. A few other resolutions of a perfunctory and complimentary nature were passed.

The New Officers. The most pronounced feature of the congress was the selection of executive officers for the ensuing year. With but one exception there was an entire change and men of ability were selected. Ex-United States Senator J. M. Carey, of Cheyenne, Wyoming, who became the president of the congress and chairman of the executive committee, is a man of national reputation, and he is especially well known in the west as the author of the "Carey Land Law," which donated one million acres of land to each of the arid states to be reclaimed. Fred

J. Mills, of Boise, Idaho, who was elected secretary, has competently filled the position of state engineer, and his report to the Governor, issued some months ago, is a valuable addition to the knowledge of Idaho's wonderful resources. With such able men as leaders, the irrigation movement will receive an unwonted impetus and we may confidently look forward to decisive action in the future.

A Few Remarks. The congress at Lincoln was remarkable in numerous ways.

In the smallness of attendance; in the lack of popular interest; in the vain grasping after sensationalism. The railroad reports show that twenty-three people paid fare to attend the congress, and the passenger association very naturally refused to haul so many people home at a reduced rate. The lack of popular interest was plainly manifested. At a congress held a year or two ago it is said that 250 ladies joined in an effort to make "Ladies' night" a success. At this congress they did not respond to a pressing invitation and the program was abandoned. A love of sensationalism or a lack of judgment was evidenced by giving prominent positions on the program to lengthy papers on the discovery of underground waters by magnetic machines, and the exploded topic of rainmaking, as well as other subjects, fit only for discussion by the "Society for the Prevention of Knowledge Among Darkest Africans."

Hawaii. The annexation of Hawaii which will be one of the most

fiercely debated questions of the next session of the United States Congress is fully treated in ex-Minister Lorin A. Thurston's "Handbook on the Annexation of Hawaii" which has just been issued. Mr. Thurston sets forth in a plain, forcible manner the reasons why the United States should annex the Sandwich Islands. In brief they are (1) Annexation will prevent foreigners from securing a coaling station, harbor and fortified stronghold commanding American commerce in the Pacific.

(2) It will increase the commerce of the Islands and secure it to us. (3) It will increase the Islands' shipping business and secure it to us. (4) It will promote peace by removing Hawii from international politics. Probably the most important consideration, however, in the eyes of western people is the effect of annexation upon the sugar industry. Our beet sugar industry is new and any decided opposition or competition would seriously injure it. In reply to this objection, Mr. Thurston states that Hawaii can never produce enough to supplant beet sugar. The sugar consumption of the United States was approximately 2,500,000 tons in 1896 and is rapidly increasing. Hawaii produces a little over 200,000 tons annually, and all the natural cane lands are already under cultivation. The United States need the Islands and the Islands need this country. We cannot afford to allow England or Japan or any other nation likely sometime to become hostile, to obtain possession of the Gibraltar of the Pacific.

The Founding of Brightside. There are 60,000 boy tramps at large in the United States according to statistics. When they are caught in the commission of some misdemeanor they are sent to the reform school or the penitentiary. Association with others as rough as themselves or with the hardened characters—thieves and murderers—in the penitentiaries, kills every nobler aspiration and all sense of moral obligation which the boys may have possessed. They become criminals and are a menace to society and a charge upon the public. A young man named Ralph Field after some experience in being buffeted about the world himself, determined to found a school for boys of this kind. Slight of stature, in ill health, without a dollar in the world, with nothing but the conviction that was within him, he went to work. In an old ramshackle, empty barn, without even a chair to sit upon the school was christened Brightside, because it meant a brighter side in the lives of the

homeless, deserted, sin-hardened boys of the country. In Denver on August 4, 1893, the teacher and one lone scholar, a young tramp, spent the only ten cent piece they possessed in all the world for some crackers and sat down in the empty barn to eat their first meal together, and that night they slept on the pine boards. Filled with lofty ideals, Ralph Field devoted himself assiduously to his self-constituted task. Day and night, in misery, in hunger, in sickness, he toiled on. Four more young tramps ceased their roving and joined the school before the end of the first week. The school continued to grow. The following from the editor of the Rocky Mountain News shows with life-like distinctness the conditions:

"Some boy whose parents had driven him from home; another whose mother was a drunkard or worse; another shoeless, hatless, coatless and starved; another without either father or mother and who had been cuffed from every door at which he had applied for food; another hiding from the police—it was from such as these that the school was recruited. Teacher and pupils slept together—on the floor often—ate together, washed the dishes together, swept the rooms and made the makeshift beds in company. As it grew Ralph Field worked the harder. He solicited food, old clothes and odds and ends of furniture. He did the begging himself. He would not permit a boy to beg. The first lesson he impressed on each and all was that they were not charity children, that the work they did about the place earned them the food, clothing and education he provided. While he begged, he didn't consider it begging. He was nerved with the conviction that his work was for the public; he was saving the boys both body and soul. He was making good citizens out of those who would otherwise prey upon society. To obtain food, clothing and shelter for such as these was compensation—his compensation, therefore, neither he nor the boys were in any sense dependent."



STACKING ALFALFA.

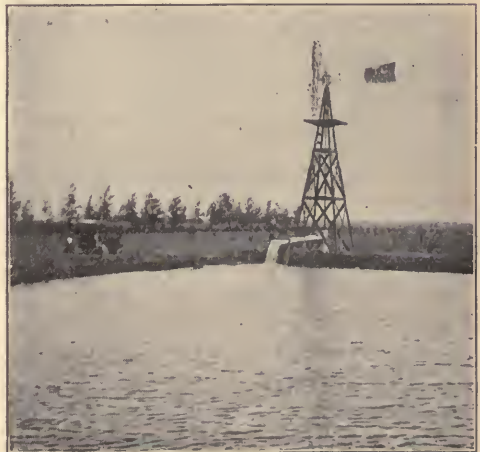
"Self help" was the doctrine he preached. "That boy is helped who is taught to help himself," he said.

How it Grew. And the school continued to grow. From the barn to a tumble down house of four rooms, then to a deserted church building, then to a ten room house, then one twice as large (which was destroyed by fire, the boys barely escaping with their lives) and then to the building it occupies at present, the school was forced to move. And now it goes to the country to Fern Farm. This last move being made possible by the handsome donation of \$5,000 by William Church, vice-president of the Golden Pressed Brick Company, of Denver. And the school needs \$50,000 more. It deserves it and it ought to have it. Think of this earnest Christian man, noble and self-sacrificing, out of nothing but the good will of a few devoted friends, and his individual efforts, housing, feeding, clothing and teaching over seventy boys (the number enrolled at present)—keeping the latch string always hanging on the outside for more.

Ralph Field a Genius. Brightside is not a "Home" as the word is used when referring to charitable institutions. It is an "Industrial School for Boys." Ralph Field works in a way to which people of large means, who support philanthropic institutions are not accustomed. About

Brightside there are none of the evidences of rules and regulations and restrictions that so predominate at institutions where wardens and boards of managers and visiting committees control matters. After a boy has beaten his way about the country a little and acquired a taste for the Arab life, he will not submit to the restrictions of the ordinary institution; he will run away. But after these boys have been at Brightside awhile they lose their roving tendencies along with other bad habits and they come to love the atmosphere of home which surrounds them all, for they are like one great family. When a person is a genius in any line he can do things in that line better than other people, and no one can explain why. Ralph Field is a genius in his particular line. His genius lies in an unfailing devotion to his work, in a love for the boys which no weariness can blunt, and the personal service for them and their welfare which is expected only from the missionary who is a martyr to his cause.

What it Aims at. Brightside is a school where boys of all kinds can get a home, an education and an industrial training without money. No tuition and no fees are asked. If a boy can work and earn money he is expected to contribute



A KANSAS WINDMILL PLANT.

a little toward the expense of his keep. If he can't work he is just as welcome. Cleanliness, industry, thrift are taught, not so much by precept as by practice. They are inspired with a love of everything that is good and noble, with the love of God and their fellow beings; their highest aspirations are awakened and they are taught to "Be good and do good." Morally, mentally and physically the boys are built up until they become noble specimens of manhood—strong limbed, broad minded, big hearted, intelligent, worthy of themselves and of their Creator.

A review of the history of Brightside, its objects and its methods, including what it has accomplished and is expected to accomplish will appear in a future number of THE AGE. It is a western institution.

Postal Savings Banks

The establishment of postal savings banks is an idea that appeals to the intelligent farmer and the farmers are the ones who will probably be most greatly benefitted thereby. With a natural suspicion of all city institutions and banks in particular, the farmer hides away the money received from the sale of his crops, thus not only inviting robbery, but needlessly sacrificing the interest which his money would earn and also withdrawing from circulation a vast amount of money in the aggregate, which if turned into channels of commerce could not but tend to sustain and probably raise the price of natural and manufactured products and in that case who would benefit so largely thereby as the farmer. There are and can be no valid objections to the establishment of postal savings banks by the national government provided the handling and investment of the funds is surrounded by all possible precautions against loss and depreciation and misuse.

The Drought Broken.

The almost unprecedented drought in the middle Western states which was broken about the middle of October by slight showers in some places and copious rains in others, is another effective argument in favor of

irrigation. Only those who have been through the country and witnessed some of the effects of the protracted dry spell can understand what a great drought this has been and how seriously it has injured agricultural interests. Late crops of corn were burned up in parts of Kansas and Nebraska, but the threatened damage to fall seeding was a much greater cause of worry. How many annoyances and grievances, large and small, can be inflicted upon the hard-working farmer, only the farmer knows. If his pastures are scorched he must find means of feeding his cattle in other ways. If his wells dry up he must get water elsewhere. When the autumn heat has put his houses and barns in an inflammable condition he must take great precaution lest a stray spark set his fields afire and burn him out of house and home. All these dangers and annoyances, irrespective of the financial loss in crops follow in the wake of the drought. How different the condition of the irrigation farmer. Water when he wants it and life-giving sunshine nearly all the time. Will the moral of this lesson be remembered?

The Klondike Craze

The great and unnatural excitement resulting from the discovery of gold in the Klondike region has already been the cause of the loss of thousands of dollars, and the winter which has already set in in that country will see the loss of possibly hundreds of lives of men who have ventured into a new and almost unknown country unprepared for the rigors of the climate or the vast distances which must be traversed to reach the gold fields, or the dangers and difficulties to be contended with after reaching them. Although it is popularly supposed that the craze will reach high water mark next spring the writer is inclined to believe that we have probably seen the worst of it already. "In the days of old, the days of gold, the days of '49" men were willing and anxious to do unheard of things to reach the gold fields and brave the dangers thereof in their desire to accumulate wealth suddenly. In those days,

however, gold mining was not the developed industry it is to-day. It is no longer necessary to go "round the Horn" to reach a New Eldorado. Nor is it necessary to go thousands of miles to an inhospitable region where the frozen dirt must be mined and held for the midsummer heat before washing out the golden grains. Each succeeding month adds to the value of the output of the mines in our own country and nearly every week brings news of new discoveries. Why, almost within sight of Denver are some lacer mines awaiting development and in the midst of civilization. When men realize some of these truths they will turn their attention to the gold fields at home.

Railroading in Alaska The Klondike gold excitement causing thousands of people to rush to the new "diggings" necessitates better means of transportation than by walking or "packing" across the vast stretches of uninhabited country which must be traversed. The four thousand mile voyage by steamer across the Pacific Ocean and then up the Yukon river is not only tedious and perilous but is confined to a very brief season of about three months. The beginning of winter in September closes the river to traffic and the ice does not disappear until the following June. Two projects are announced for giving railway facilities to Alaska and both by American syndicates. A Seattle corporation is reported to have subscribed capital for a line through White Pass from Skaguay to Lake Bennett. Another report says that the surveys are being made for a narrow gauge line through Chilkoot Pass. Building mountain railroads is a costly enterprise as has been very clearly demonstrated by the lines running through the Rocky Mountains. And the enterprise is far from being a profitable one even when the railroad runs into and through rich gold fields. With the exception of the gold mines situated within a comparatively limited area surrounding Dawson City we know little or nothing about the resources of this region. Other sources of wealth must be

discovered, so that a permanent population will be established before extensive railroad construction will be seriously contemplated.

Increased Gold Output While the world has been standing breathless, awaiting the slightest whisper from the Klondike it has overlooked and neglected the astounding increase in gold production that has been going on in our very midst in our own state of Colorado.

The figures follow:

Total receipt of gold at the Denver branch mint for the first nine months of 1897.....	\$8,388,088.56
Same period in 1896.....	3,128,436.16
Gain.....	\$5,259,652.40
Receipts for September, 1897.....	\$1,149,365.59
Receipts for September, 1896.....	443,356.74
Gain.....	\$ 706,008 85

This does not represent the total gold output of the state but merely that portion of it received at the Denver mint. Comment is almost as unnecessary as is a trip to the Klondike when we have mines fully as rich as any to be found on Alaska right at home.

Dried Vegetables. The drying of vegetables in a manner similar to the way fruit is dried is a new and peculiar industry recently developed in Santa Clara County, California. Potatoes, carrots and onions seem to form the staple product. The vegetables are sliced, then slightly treated with sulphur fumes, as an antiseptic and to retain their fresh color and then dried in evaporators. It requires six or seven pounds of fresh potatoes, nine of carrots and twenty of onions to make one pound of the dried product. There is a good demand for the dried vegetables, especially in the mining regions where fresh vegetable cannot be obtained and they seem to be preferred to the canned product. The experiment so far has proven successful.

TO THE PEOPLE OF THE UNITED STATES.

THE National Homeseekers Association in annual convention assembled sends greeting to the people of the United States.—Of recent years the crowding of people to the centers of population has been more pronounced than ever before in the history of our country and the increase in population in the cities, especially the larger ones, has been as disastrous as it has been wonderful and our foremost statesmen and thinkers concede that it is detrimental to the best interests of the American nation. Three-fourths of the people of this country are today living in rented homes while millions of acres of land are awaiting the touch of human industry.

No nation can hope for continued growth in the material as well as the higher attributes of civilization which is not founded upon justice and equality and which is not sustained by the sturdy strength of sentiment of its citizens at large.

The National Homeseekers Association aims to arouse a sentiment in favor of "home owning." It aims to inculcate in the breast of every man and woman and child a desire to possess a home. It aims to advocate a national policy, comprehensive, and statesmanlike, to harmonize conflicting opinions and to find a basis for a just compromise between extreme views.

We hope to inaugurate a new era of industrial development and material progress by turning a stream of immigration on to unused, unoccupied, fertile agricultural lands, believing that in this manner hundreds of thousands of people will become home owners, independent and prosperous. The great end in view is to utilize vast tracts of land now lying idle for the employment and sustenance of a large population under conditions guaranteeing industrial independence and a greater measure of human equality; opening new avenues for the profitable employment of labor and capital and offering security and satisfaction to both.

The National Homeseekers Association is purely philanthropic in its purposes. Its motto is "Homes for the People." We are dealing with problems involving the prosperity and happiness of millions of people, the welfare and continuance of the government and the evolution of new and better social conditions and more advanced forms of civilization.

The work of this association has been faithfully carried on in the past by the unpaid but patriotic men who firmly believe that these problems are of national importance and involve our national destiny, and the time has now arrived to present conclusions from the platform and through the press.

The National Homeseekers Association invites the aid and active co-operation of patriotic citizens, associations and industrial organizations.

JAS. GUNN, President, Boise, Idaho.

MARCUS P. BEEBE, 1st Vice-President, Ipswich, S. D.

FRANK H. DRYDEN, 2nd Vice-President, Pocomoke City, Md.

GEORGE E. GIRLING, Secretary and Treasurer, Chicago, Ill.

REV. DR. JOHN RUSK, Delegate-at-Large, Chicago, Ill.

National Headquarters 112 Dearborn St., Chicago.

A Home Near Denver.

... THE very mention of the name Denver brings suggestions of pleasant homes. Denver is a city of homes—not tenements. It also suggests grand mountain scenery, a delightful climate, marvelous mineral wealth and agricultural and horticultural products of the very best.

Prosperity in Colorado.

A home in this region will afford you the greatest satisfaction and will insure you prosperity beyond any ordinary experience in other localities. The direct advantages are a wonderfully rich and fertile soil, an abundance of pure mountain water suitable for every domestic use as well as for irrigating, a climate which cannot be excelled for comfort and health and the best market between the Missouri River and the Pacific Ocean.

The Opportunity is Yours

to own a home within sight of the Capitol building of the great State of Colorado. Not only a home but an income. A thousand dollars invested in a six per cent. security would return sixty dollars a year interest. The same amount of money invested in one of our fruit farms will yield over **two hundred per cent yearly.**

Farms at Low Prices and Long Time.

The Denver Land and Water Company owns a large body of land just south of University Park, Denver, under the best irrigation system in the State. Over a thousand acres are now under cultivation, planted principally with fruit trees, apples, pears, plums, cherries, etc. Several sections have been platted in five and ten acre tracts and are now on sale. Low prices and long time, combined with fair and reasonable treatment, is causing the land to sell rapidly.

A pamphlet, with a map and illustrations, will be sent those who wish to secure a home where they can be content and where they will be sure to prosper

If you ask for it.

It will tell you without exaggeration about the soil, the water supply, the climate, the products and the market. Fruit-growing, dairy farming, truck gardening and poultry raising are all being carried on successfully and profitably now.

Don't delay but send at once for further information.

THE DENVER LAND AND WATER CO.,

114 Dearborn Street, CHICAGO.



THE IDLONY
JULY 15

FIRST PICNIC OF PLYMOUTH COLONY.

IN BARBER COUNTY, KANSAS.

A LETTER FROM A WOMAN WHO HAS MADE A SUCCESS OF FARMING.*

I DO not know if you care for information from this district for your Homeseekers Association, but I have followed the movement with great interest and much sympathy and if I can give any help shall be glad to do so. I have seen people come out into new countries, who have suffered from the loneliness and misery of being amongst strangers in a strange land. Who have wasted substance and courage through want of friends, or knowledge of how to turn and find work and a home, and yet these strangers are needed and would have been happy, if they had only had a helping hand and the right place; and I do not know of any movement calculated to do good as widely as the one you are secretary of and any information I can give will be gladly sent if you think it of use.

The section of country here has suffered through bad seasons and wide-spread depression of business, but the natural advantages are very great and the people who have stayed on and worked are now reaping the benefits and there is a verve and glow of renewed hope through the whole district that is as rousing as one of our own breezes. While we have not done much irrigating in our county, the little now in operation has been most successful and there are hundreds of acres on the banks of creeks and streams that can be irrigated at a smaller expense than I have seen possible elsewhere. For instance many people here have taken water by small ditches from the creeks to

water, say from one-fourth of an acre and up to ten and twenty acres. Then others do not care for this and put up a windmill, cost of same running from \$50 to \$150 and the wells are very seldom deeper than forty feet and on the lowlands not more than from four to twelve feet to water, and an abundance of water is given from these. Being essentially a cattle country, most of the people have large holdings of land and do not trouble to raise even their own vegetables, and so for those who do there is an excellent home market, all kinds of vegetables, carrots, potatoes, cabbage, beets, etc., are largely brought into the place and sold at a decent price. Tomatoes, small fruits of all kinds, such as currants, strawberries, blackberries and grapes are also imported and those who have them to sell invariably obtain a good profit. I have mentioned especially the ordinary necessities in way of vegetables and small fruits and such as grow here to perfection. Peaches, plums, pears and apples are very fine here. Melons are exceptionally good, sweet and of a rich flavor.

Some element in the red soil of this district suits all plants we have tried that give a large per cent of sugar. The sorghum and sugar beets grown here have shown by long working tests that this is so. The climate, though too dry on the whole for a sure crop every year, is as far as health goes, for man and beast almost perfect. We have so much sunshine that a gray day puts us all into a dismal mood. Our winters are so mild that we often fail to prepare for them and when a cold snap does come, we pity those further north and wonder they don't come here where we can de-

*Miss Mary Best of Medicine Lodge, Kansas, is widely known as a successful farmer. She was the first person in her county to adopt irrigation methods and traveled hundreds of miles to gather information regarding the use of water. The last few seasons she has devoted particular attention to the growing of sorghum and has been successful.—Ed.

pend upon the sun being our good friend again in a day or two. The earth is a warm, red, rich soil, no hard clay subsoil, but the sandy loam goes down and down, draining away into subsoil any rains that come and drawing it up again when wanted. There are not a dozen days in the year when the roads are muddy. A very little irrigation is needed to help the rainfall. I have flooded several fields in winter and raised from them the following years immense crops of corn and sorghum, though the years were ones of great drouth.

All the farmers here who have a few cattle, hogs and poultry are perfectly sure of a good living. We have fine buffalo grass range for summer up to end of October or longer. Then we raise more winter forage, I suppose, than any county in Kansas, this being the very nucleus of sorghum and kaffir corns of the finest varieties and winter has no terror for us. When our crops are so heavy we never get them all cut up but turn in the cattle to clean the fields as they will. Hops and poultry thrive and pay all the time. Many families buy all their groceries with eggs and chickens. For larger holdings in cattle, I presume no place could offer better advantages. Grass

good and cheap for six months in the year, winter feed abundant, shelter and water everywhere. Good marketing facilities.

Socially we have a pleasant time. Schools, churches, clubs, etc., an honest and sober people and like most western communities most kindly disposed one to another.

What's the matter with Kansas may trouble some people, but Barber County begs to say there is not much to grumble at here. Now and then we get a sandstorm a vile rushing wind, that drives the dust and dirt into every cranny and nook and does not leave a sweet tempered woman in town or country; and during these spells the men are, to a man, as meek and mild as milk. In summer we have warm weather, but cool nights. We have years when corn burns up, but grass never fails and sorghum keeps green and we have chances to irrigate at an outlay so small it seems a marvel we do not all go ahead and do it. We make many good resolutions, then there comes a season when it is such warm, moist weather, our crops grow by magic and in the many years of plenty we forget the famine.

MARY BEST.

IRRIGATION.

By Arthur Howard Hall.

As silver streams through mountain courses
seek,

By man's deft aid, the bleaching arid plain,
With healing, tranquil flow,
Like cooling hand on fever's burning cheek,
Bringing new flowers and leagues of wav-
ing grain,

Golden as sunset glow.

So in deep confines of the pensive brain,
Thought like a lakelet glistening in the sun,
Trickling o'er the stones to waste;
A hand has turned to bless and heal again,
Love's crystal waves by channels new, that
run,

Where man his need has traced.

Bradford, Mass.

THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs. Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

CHEESE MAKING IN UTAH.

AS THE AGE thoroughly believes that the diversified farm is the mainstay of irrigated farming, we are glad to give the space necessary to show what is being done in this industry. There seems to be no valid reason why dairying should not be carried to as successful an issue under irrigation, as has fruit culture. We have the alfalfa in almost unlimited quantities, good dairying cows, and the pure, dry atmosphere usually found in the "Arid West," the natural elements of success, all that is lacking is the skill and enterprise of the experienced cheese maker.

At the Columbian Exposition, Canadian cheese carried off the honors, as it captures the trade and gold of Great Britain. This latter result can be largely attributed to the shortsighted and dishonest policy of many cheese factories in the United States, exporting partially skimmed and filled cheese, as genuine full creams. These methods have practically destroyed our home and foreign markets to such an extent, that today the dairy states of the East are passing laws looking toward the remedy of this abuse, so that bogus cheese will be sold as such, or its manufacture prohibited.

Without good milk from healthy cows, thoroughly aerated, properly handled by the farmer, good cheese is impossible.

The methods followed successfully at one factory in the Cache Valley, will enable THE AGE readers to form an estimate

of what is needed to produce good cheese, and if the conditions in their neighborhood are favorable to similar enterprises. A professor of the Agricultural College thus describes their methods: When the milk arrives at the factory it is run into the vat and there heated to 84 or 86 degrees Fah., thus placing it in the best condition for the action of the rennet. With the milk at the proper temperature we next proceed to determine its ripeness by means of the rennet test; take 8 ounces of milk from the vat, measured accurately, being careful to keep it at the temperature of the milk in the vat. To this add one gram of standard rennet extract. Stir the milk for ten seconds to thoroughly mix the rennet with the milk and the length of time from adding the rennet till the milk thickens is called the test. The importance of this test is that it tells us in what condition the milk is at the beginning of our work, and then we can modify our after treatment in such a way as to produce an even quality in cheese. If the milk is working fast or much acid is developing we know it at once, and by the use of extra rennet and quicker work in cutting and heating it enables us to get a good cook on the curd before it is ready to dip; or if the milk is quite fresh and working slow we might use a starter to hasten the work and yet from our knowledge of the condition of the milk at this early stage be able to control it. The rennet that we have used this winter is

from 16 to 18 seconds, and during the summer and fall about 20 seconds. When the milk is ready for setting add the color, if colored cheese is made; the amount varies from one-half ounce to one ounce per 1000 pounds of milk. As in butter it should vary to suit the market. Mix it thoroughly with the milk. Next add rennet; for keeping cheeses two and a half ounces to three ounces is enough, but for cheese that is to be put on the market in a few months four to five ounces per thousand pounds of milk is used. We always dilute the rennet, with luke warm water, never hot, and mix thoroughly with the milk stirring for from two to three minutes. See that all currents are stopped in the milk and that the floor is not jarred, as either is apt to cause a poor coagulation, thus loss. When the curd is ready to cut it is generally determined by wetting the finger and passing it at an angle of forty-five degrees into the curd, and lifting slowly; when it breaks clear it is ready to cut. Our practice is to use the horizontal knife first, cutting one way of the vat. This, if carefully done, divides the curd into cubes about one-half inch in size. If the milk is working fast we cut finer. We generally allow the curd to stand three to five minutes till the whey comes on top and then start to stir, very gently at first, loosening the curd from the sides and bottom of the vat. Careful handling at this stage means a much smaller percentage of loss of fat and casein in the whey. The curd should not be allowed to mat together. Ten to fifteen minutes after cutting heat should be turned on, and the curd gradually warmed, taking from thirty to forty minutes to reach 98 degrees Fah., the curd being kept stirred meanwhile. Five to ten minutes after the curd is heated we cease stirring. Our next point is when to draw the whey, and to determine this we use what is called the hot iron test. Take a piece of the curd, squeeze it tightly in the hand to remove the whey and toast it on a hot iron. When acid and other changes

have developed far enough the curd will string in fine hairs one-eighth inch for spring and summer cheese and one-quarter inch for fall and winter; then the whey is run off. Our practice is to lift the curd upon the racks from one end of the vat and by stirring to facilitate the removal of the whey. It is important in handling several vats and also in each days make to be careful to leave as nearly as possible the same amount of moisture in each curd. The curd is now allowed to mat together, and in about twenty minutes is either broken or cut into pieces and turned. Next turn and pile two deep and so continue turning often enough to prevent the whey coming on top of the curd. When the curd will string from three-fourths of an inch to one and one-half inches on the hot iron it is milled, that is, cut into small pieces. This is usually from one and one-half hours to two hours after dipping. For a very moist, over-ripe or tainted curd it may be earlier, or for a gassy curd later. Up to this stage it is best to keep the curd warm (94 degrees Fah.) but now gradually cooled till ready for salting at about 80 to 85 degrees Fah. After milling the curd is frequently (every 15 or 20 minutes) stirred, thus keeping it apart, exposing it to the air and ripening it. When it is oily or shiny on the outside and silky to the touch it is ready for the salt. Salt is an anti-septic, and should be varied according to the amount of moisture in the curd and the length of time the cheese is to be kept before putting on the market. From one and one-half to three pounds of salt per thousand pounds of milk. When the curd has lost its harsh feel the salt has dissolved and it is ready for the press. Our plan is to press lightly at first and gradually increase. In thirty minutes to one hour the cheese is ready to dress or fix the bandage and may be put in press again for the night. Next morning we take the cheese from the hoop and turn it and put back to press for an hour or two. It gives an improved appearance to the

cheese. When taken out of the press they are placed in a curing room, usually on the top shelf, then branded, noting that month and date, which with the notes taken during the day helps us to follow up the history of the cheese. Experienced cheese makers say that only one half the work of the maker is done when the cheese is placed in the curing room. The cheese should be turned every day and the temperature of the room kept as near as may be between 60 and 70 degrees Fah.

IRRIGATION FOR THE DEVELOPMENT OF FRUIT.

THE fruit tree—or plant—is a wonderful laboratory and manufactory. It takes the crude materials from the air and soil, manipulates them in unison with that greatest of alchemists—the Sun—in such a manner that our greatest chemists are puzzled and baffled to explain how it is done. The microscope, retort, condenser and test tube have all added their quota to the investigation, but how and why a peach tree will manufacture peaches from the same soil constituents, as the cherry trees makes into cherries, or the grape vine turns into grapes, is as far from solution as ever. The fruit tree takes the phosphate, potash, nitrogen, lime, etc., from the soil only when they are dissolved in water, hence the great virtue and value of water.

The sponge-like fibers at the end of the rootlets absorb the food laden water, it is carried up through the roots, stem and branches to the leaves, which in their turn—sponge like—absorb carbonic acid gas from the air, transforming all the materials gathered from the soil and air into wood, bark, leaves and delicious fruit.

The late P. of. Asa Gray, computed that the Washington Elm at Cambridge, must produce every year some 7,000,000 leaves, equal to 200,000 square feet of surface, or about five acres, yet the crown of this tree is only about 70 feet in diameter

therefore does not come over one-tenth of an acre of land.

At Erlangen, Germany, Prof. Pfaff studied in detail the amount of water evaporated by an oak tree between May 28th and Oct. 24th, i. e. from the time the leaves appeared until they fell. He found this tree pumped from the soil 264,000 pounds of water into the air during this time, and that this amount of water was $8\frac{1}{2}$ times more than fell as rain during the same time, on an area equal in circumference to the tree top.

If then a tree transpires so much water from the soil, and trees can only secure the materials they require for the growth of wood, fruit, etc., through the medium of water, is it a wonder that it should be found necessary to supply water artificially during the long summers of our Western states.

But too much of a good thing is sometimes worse than none. Too much water can be used in the orchard, rendering the fruit soggy, of poor flavor, impairing the health of the trees and rendering them less able to withstand the assaults of fungoid and insect parasites.

An ideal condition would be to keep the soil of the orchard sufficiently moist at all times thus giving the trees the chance of securing enough food for its fullest development. But to do this requires knowledge, skill and good judgement which alone can be learned by experience.

PROFIT IN ONIONS.

Many large crops of onions have been harvested this season and those not growing the crop are no doubt anxious to engage in the business next season, because it is one of the most profitable of vegetable crops.

This reminds the writer of a story of an onion crop which was favorable to the onions but derogatory to the potatoes. This is the story in brief:—

A priest was traveling through a certain portion of Ireland and he stopped one

day at the door of a humble looking shanty before which the renter was standing. After salutations and inquiries about the health of the family the priest said:

"Well, Jim, how are your crops coming on?"

"Poorly, yer riverence, poorly."

"But your potatoes are alright aren't they?"

"No, yer riverence, yer see the mon next door planted onions."

"Well, suppose he did, that had nothing to do with your potatoes."

"Yer see yer riverence he planted a lot of onions."

"But what had that to do with your potatoes?"

"Well, yer riverence, yer see thim onions was that strong that me 'taters couldn't see to grow fer wiping their eyes."

To grow a good crop of onions the soil must be selected carefully. Take a location that has been free from weeds during the past two years at least. New land is the best in the West from the fact that weeds do not trouble during the first year. It is well to break the land in the fall or winter and work it as early in the spring as possible.

The amount of fertilizers required depends upon the soil and its condition when the fertilizer is used. A very satisfactory crop of onions can be grown upon almost any soil if it is well filled with vegetable matter, thoroughly fertilized and well drained. The onion crop is a very profitable one. True it requires a lot of back bending work in weeding, but the returns per acre are enormous. In Pawnee County, Kansas, a year ago the writer saw an onion field which produced 800 bushels per acre and they sold for fifty cents a bushel.

IRRIGATION OF RICE.

Rice plantations are successfully conducted only where the land is flat or having but a very gradual slope. These conditions are usually found in marshes along

the sea shore, but other sites may be equally as productive. The salts or even alkaline substances do not injure the crop as most of the mineral substance is carried away by evaporation. In some localities the salt has almost been removed from the land by the repeated flooding with fresh water necessary to the growing of rice.

Sometimes rice plantations are used one season for growing rice and the following year are drained and planted to other crops. This method has proven very successful in both ways. The irrigation of the first year carries a large quantity of silt on to the ground that acts as a fertilizer for the next crop.

The growing of rice is recommended upon unproductive soils, as a fertilizer in addition to the crop harvested. The fertilizing properties in the water make the land valuable for cultivating in a short time. If there was sufficient movement of the water to keep it pure much of the unwholesomeness and unhealthfulness of the rice plantations could be avoided and it would become a profitable crop throughout some sections of the West.

BLACK SCALE IN AUSTRALIA.

IT is well known that orange and lemon trees grown near the sea in California are frequently infected with black scale or "smut". This pest affects both the tree and its fruit, requiring the latter to be cleansed by washing or otherwise to render it marketable, although the flavor or wholesomeness of the fruit is not at first impaired by the smut. If allowed to go on unchecked, however, the pest will destroy both tree and fruit. The smutty appearance of the leaves and fruit is caused by the black scale insect and much time and money have been spent in California in spraying the trees and otherwise treating them to remedy the evil. Within the past two or three years, however, a parasite which preys upon the black scale, known

as the *Rhizobius ventralis* has been imported from Australia and has done good work in many orchards in the state. Olive trees are also subject to the ravages of the black scale, as well as some other varieties of trees, especially if grown near the sea coast—say within ten to twenty miles.

Mr. Elwood Cooper, of Santa Barbara county, has used colonies of the Australian lady bird (the *Rhizobius* above mentioned) in his extensive olive orchard, with great success and believes it a sovereign

a remedy. He has read our last year's notes on the treatment of pests as reprinted by the Agricultural Bureau, and has concluded that the treatment recommended for peach aphid would be suitable, but before applying the bluestone to the roots, he wishes to know whether it would hurt an evergreen? The precaution proves a wise one. It is a mistake to call the scale an aphid—the insects are quite different. But having misjudged the enemy, it was quite natural to go astray with the treatment. "J. B." has not sent a specimen, but the mention of a scale-like insect, as-



ALFAFA FIELD ON CLARK COLONY LANDS NEAR DENVER.

remedy for either the black or brown scale.

It may seem a little strange, however, that in view of the importation of this pest destroyer from Australia the authorities there recommend other and apparently more expensive means to the same end. *Garden and Field*, the official organ of the Department of Agriculture of South Australia, published at Adelaide, in reply to a correspondent says:

"J. B." says that his orange and lemon trees are affected with a black smut and brown "scale aphid," and wishes to know

sociated with black smut on the leaves, allows little doubt as to the pest being the common brown scale which infests orange, lemon, oleander, and other trees. It clusters on the twigs and leaves, especially up the mid-rib, and exudes a sticky, sweet substance, of which the common "sugar" ant is very fond. On this exudation the black "smutty" fungus grows. The remedy is to kill the scale, and the fungus will disappear from want of nourishment. We have used both resin wash and kerosene emulsion with complete success for this pest. It is merely a question of convenience in making and using. The emulsion

must be applied fairly strong, but full directions as to how to make and use are contained in the leaflet you have. The latest information on the subject is also being printed in the *Garden and Field*, which you should take. If you have not had experience of either compound, we would recommend you to try the resin solution. Make as directed. First dissolve your soda crystals in boiling water, and while the solution is boiling, gradually add the powdered resin, keeping the solution stirred all the time.

WHEN TO IRRIGATE.

When to irrigate is a serious problem, especially so with new settlers. To lay down an inflexible rule would be absurd and in fact impossible. The main point is to watch the appearance of the crop and give water as the conditions demand it. Root crops will thrive best if irrigated frequently; corn when small, should have but little water, frequently none, until it is several inches high, but when it is earing out it will require a great deal of water. This is true of all crops when the grain is filling out and the most rapid growth is being made. The water should be shut off when the grain is hardening.

WATER AND A HOT SUN.

It is dangerous to allow water to stand about the plants when a hot sun is shining on them. Cabbage and even alfalfa in some soils can be killed in this way. The application of water to growing crops is a matter that requires a great deal of investigation. There are so many conditions to be considered and different objects to be accomplished that comparatively little in the way of rules and regulations can be definitely stated. What is best in some soils is not good for others and what is good for some plants in some climates is not good for the same plants in other climates. The best injunction is to "go slow."

BEANS AND PEAS, WHY NOT.

The business of growing beans and peas seems to be somewhat neglected. Both crops are profitable and the market is as-

sured. In these crops there is no over production as the census returns show directly the opposite. In 1891 the net imports of beans and peas over the entire exportation amounted to nearly one and a half millions of dollars.

Why should either of these articles of food be imported when there are so many fields in the West that would yield handsome returns if planted with these vegetables. Proper cultivation, harvesting and marketing, are essentials of success. The demand is not supplied by home growers.

BEES AND FRUIT.

The question of bees and fruit trees again commands the attention of horticulturists and apiarists. In some sections where bees are numerous, the fruit growers are troubled during the packing season and naturally condemn the bees without stopping to reflect upon the advantages derived from them in fertilizing the trees and vines from which the fruit is taken.

The proprietor of a cherry orchard in California found that his trees did not bear remunerative crops after the fiat of the raisin growers banishing the bees to a distant canyon. Being convinced of the necessity of bees to fertilize the bloom he procured some colonies, located them in his orchard and then realized satisfactory returns.

SUGAR FROM POTATOES.

A cablegram from London says:—An extensive economical revolution is in sight if the claims of Dr. Prinzen Gerling turn out to be what the doctors assert they are. Dr. Gerling, a government official of Java, and formerly professor of chemistry at the University of Amsterdam, announces the discovery of a simple method of converting potato starch into sugar. He has lodged his description of the method with the French Academy of Sciences so as to secure priority for his invention, although he is not quite ready to make the details public.

WHAT SUGAR BEETS WILL DO.

The following by Albert Geberding is from a paper recently read by him before the San Francisco Chit-Chat Club:

Seventy moderate size factories in California would utilize 500,000 acres of land; would make annually 7,000,000 tons of sugar, nearly one-half as much as Germany, equal to the product of France, Russia or Austria, and four times as much as the Hawaiian Islands, and a sixth of the entire world's beet sugar output.

This would mean the annual disbursement of \$14,000,000 for labor, fuel, etc., and \$22,000,000 for beets, or would represent a total investment of over \$35,000,000.

We consume annually 2,500,000 tons of sugar.

We pay to foreign nations about \$120,000,000 annually for sugar.

We have the land, we have the climate and we have the brain and sinew to produce all that we require. Germany, France, Russia and Austria have been teaching us for fifty years how to make beet sugar, and have demonstrated that beet sugar pays.

They have 1245 factories, while we have only eight in the entire United States.

How much longer will intelligent and enterprising Americans send their good dollars to foreign countries to pay for a product that might be produced at home?—*Pacific Rural Press*.

NOT VOUCHERED FOR.

The roots of the alfalfa—a Colorado product—reach down from seven feet to thirty-eight and one-half miles.

The market gardeners near Denver hitch up their horses in the morning, fill their wagon beds with Colorado's soil, plant their seed, and with the aid of Colorado sunshine are enabled to supply their customers in Denver with fresh vegetables upon their arrival two hours later.

WHAT DID YOU GROW?

Harvest time is just closing and THE AGE wants to know the result of your work this season so that we may give our readers in general the benefit of your experience. What was the total acreage you cultivated. Give particulars as to each crop and the area it occupied. What was the yield? Make separate statements for the products of farm and orchard. We want irrigators every where to write us briefly by letter or postal card in reply to these inquiries and this will enable us to compile facts of great importance to all. It is such practical facts from practical men on topics of direct and timely interest that we are always eager to obtain. Don't wait until you have gathered all your crops. Write now, you can write again later.

TOO MUCH WATER.

Great injury has been done everywhere by the use of too much water. The quantity that has been available under the liberal policy of some companies, permitting everybody to use practically all they have cared to, has proven an injury rather than a benefit, and the best results have been obtained by those whose experience has led them to use water cautiously and more intelligently; and a great deal depends upon the cultivation. The proper choosing of plants, cultivating when the soil is just in the proper state to prevent clods, harrowing the ground if heavy and rolling if it is light to make a better seed bed and to promote capillary attraction, clean and frequent cultivation. Use less water and cultivate more.

ANTIDOTES FOR ALKALI.

There are antidotes for all the different forms of alkali. The neutral alkaline salts, common salt, Glauber's salt, sulphate of potassium, etc., are only injurious when present in large quantities and must be washed or drained from the soil. The soluble earthy and metallic sulphates and chlorides such as Epsom salts, bittern,

chloride of calcium, alum, copperas, etc., find their antidotes in lime. Alkaline carbonates and borates which are the most injurious, rendering the soil-water caustic and corrosive find their antidotes in gypsum and land plaster. A little knowledge and judgement will overcome all difficulty from alkali.

POINTERS ON POULTRY.

Grit must be sharp.

Feed before you water.

Do not feed glass for grit.

Feed a mash the year round.

Good food is positive economy.

Clean out the feed troughs daily.

Oyster shells are too soft for grit.

Do not feed corn during hot weather.

Never throw soft feed on the ground.

Round pebbles will not answer for grit.

In feeding grain in the runs, broadcast it.

Millet seed is a great egg-producing grain.

Always feed the mash crumbly, not sloppy.

The noon meal is not necessary during summer.

Do not allow the mash to sour in the troughs.

Beans are excellent feed, being highly nitrogenous.

A quart of feed for twelve hens is a good measurement.

Milk can be fed in any form—sweet, sour or buttermilk.

Sorghum and broom corn seeds are excellent for a variety.

The dried blood sold for fertilizer is dangerous to use for poultry.

Split the carrots in halves, and allow the hens to peck at them at will.

Have the feed troughs sufficiently large so that all the fowls can find room.

Beef blood mixed with ground grain is excellent for both old and young stock.

Popcorn contains more nitrogen and phosphates than the regular Indian corn.

Refuse crackers and stale bread makes an excellent addition to the morning mash.

Buckwheat is an egg-producing food, but a steady diet of it is apt to be overfattening—A Few Hens.

An Indiana woman played a joke on old Dame Nature this summer, by inducing a lilac bush to blossom twice in one season. Having heard that picking off the leaves immediately after the bush had bloomed in the spring would cause it to again blossom in the fall, this woman tried the experiment. Regardless of the amusement of her sceptical friends, she stripped her lilac bush of its leaves, and succeeded in making the poor shrub believe spring had once more arrived. Accordingly it again leaved forth and by the first of September, produced beautiful white flowers, as perfect and fragrant as those which it bore earlier in the season. The writer, being one of the numerous "Doubting Thomas" order, received by mail a small cluster of the fragrant white blossoms, and as "seeing is believing" is quite convinced that the Indiana lilac did double work this season. Whether it will blossom at the usual time in spring remains to be seen.

W. R. Leigh's illustrations for William Allen White's article in the November *Scribner's* on "The Business of a Wheat Farm" give a panoramic impression of the immense extent of the great bonanza farms, and the bustle and activity of harvest time, when carloads of machinery and herds of horses are used in cutting and threshing the grain.

An article by Mark Twain written in the style of "The Innocents Abroad" and illustrated by A. B. Frost and Peter Newell is in the November number of *McClure's Magazine*. The Mark Twain article will consist of chapters from the forthcoming book on his recent journey around the world, and is the only part that will be published in advance of the book itself. It follows, those that have read it say, the earlier Mark Twain manner, which is undoubtedly the most popular.

MAXIMS FOR THE IRRIGATED FARM.

Better de seat deceit.

Let the big I become *wee*.

Slough off the despondency.

Don't toughen a tender heart.

Your hat is your top-dressing.

Kerosene will destroy tree borers.

Better try dieting than die eating.

A "pressing knead" for the bread.

What saves stomach pillage? Fruit.

Didst ever hear of a righteous wrong?

Prepare your hotbeds for next season.

"Birds off a feather"—moulting hens.

The book (keeping) farmer is all right.

A false friend is an adulterated a-dult.

Be consistently persistent in the right.

Plant lice can't bite—they are "suckers."

A good journal is a study in black and white.

An eclipse of the son—Keeping the boy down.

Go bury your biliousness in the berry patch.

You must be—if you'd gain a point—a live (?)

Tomatoes are good, profitable winter vegetables.

The best or worst age for a cow may be her lineage.

Why don't you consider it a privilege to help others?

A man often hits his enemy harder by not striking.

The hog wants a *pen-shun*—in that alfalfa pasture.

Better to cultivate than harrow your wife's feelings.

Does irrigation need more preachers or more practicers?

Cultivate young orchards thoroughly the first three years.

Lots of people suffer from the *back-tear-er* of a heavy lift.

Clay and flat soils are benefitted by the application of lime.

If you practice what you preach, you are one of a thousand.

Don't aerate your opinions too much—they might blow away!

Better curry favor with your horse by means of a currycomb.

A *school-house* ought to be a hot house for starting young ideas.

Before you attempt an off-hand answer, have your facts *on hand*.

The worst "dead head" on your farm is the head that won't think.

The gardener who has the most success, often has the most failures also.

You have "cussed" that luck of your'n long enough. Try to *dis cuss* it.

Use all the winter water possible. It will be so much saved next summer.

Be a "green goods man" to the extent of raising green goods in your garden.

The easiest-keeping stock is a hydraulic ram. It runs on air—with a little oil.

A sneer is generally the facial expression of known, but unadmitted defeat.

The worst thing about a "crank" is that he generally connects with a wind pump.

How many times have you "taken a fool's advice" by "having your own way?"

Too much food for the cat creates "that tired feline" which causes joy among rats.

When there is a "screw loose" in the head, it is generally on the hinge of the tongue.

Long rows of vegetables or plants mean less waste land for turning plows and cultivators.

Did you ever know a railroad company to charge less for carrying second-class produce?

Luck always comes to him who believes that the only chance for success lies in hard work.

Don't leave your machines in the field to get rusty now that the seasons work is nearly done.

Don't neglect to plow your garden this fall. Early plowing is best, but better late than not at all.

The great thing in this world is not so much "where we stand" as in what direction we are moving.

Simple science makes appliance of the laws of life easy going; truth is growing—down with wordy strife.

Ignorance is a blank sheet, on which we may write; but error is a scribbled one, on which we must first erase.

We believe in bi *mental* ism for the home—give both father's and mother's thoughts a chance to circulate.

When vice is used as a multiplicand and idleness as a multiplier, the product may be found in our prisons and jails.

"Back numbers" are needed for reference and comparison. No reason why *you* should be one if you don't wish to be.

Here's a question I wish you would run through your brains: "If they tied your home tyrant, would *you* be in chains?"

Sitting on the counter at the village store declaiming about monopolies, won't save the country. That's not the counter irritant this country needs.

AT THE MINSTREL SHOW.

NO CAUSE FOR ALARM.

Tom—"They say that the white house has insufficient exits in case of fire."

Jack—"Well, I don't suppose that worries McKinley. He isn't likely to get fired."

HER MOTTO.

"Better late than never,"

She said as she turned the lock—

He'd just proposed and said good-night,
And it was twelve o'clock!

TRUE BROTHERLY LOVE.

Raggs—"I was passing the insane asylum today and stopped in to see your brother."

Jaggs—"Did he ask about me?"

Raggs—Yes. He's crazy to see you."

AS IT IS IN KENTUCKY.

Willie—"Pa, what's a smiling landscape?"

Pa—"It's a field of corn or rye in Kentucky, Willie.

IN SUFFERING KANSAS.

Sprocket—"That's the last time I'll ever use that red and green lantern."

Gearing—"Why, what's the matter with it?"

Sprockett—"I had it on my wheel last night and half the men in town were chasing me, thinking I was a traveling drug store."—*Chicago Daily News*.

Arkansas City Traveler: Man that is born of woman is of few days and full of trouble if he does not get full of anything else.

THINGS ABOUT DENVER.

Denver's population is 175,000.

Twenty-one railroads enter Denver.

Altitude, 5,200 feet above sea level.

Denver has 181 miles of street railway.

The sun shines 340 days out of the 365 in Denver.

Denver's smelters produce over \$30,000-000 annually.

Denver has 30,535 scholars attending her public schools, and 500 teachers to teach them.

There are 121 churches in Denver with a membership of 47,105; property valuation, \$4,212,000.

THE IRRIGATION CONGRESS

The Sixth National Irrigation Congress was in session at Lincoln, Nebraska, September 28, 29 and 30. The permanent organization of the Congress was effected by the election of the following officers:

President, Senator J. M. Carey, Cheyenne, Wyo.; first vice president, S. A. Cochrane, of South Dakota; second vice president, L. W. Shurtliffe, Ogden, Utah; third vice president, S. M. Knox, Princeton, Ill.; secretary, T. G. Frost, Minneapolis, Minn.; minute clerk, O. E. McCutcheon, Michigan; reading clerk, P. B. Maxson, of Nevada; bill clerk, P. C. Erickson, Nebraska.

Numerous papers on various topics were read or filed with the secretary and will be published in the report.

The principal work of the Congress was the passage of the resolutions, the committee on resolutions reported, through its chairman, Elwood Mead, of Wyoming. The following resolutions were adopted:

"The value of the irrigated farm, the security of the homes thereby created are alike dependent upon the efficient public control of the water supply and the prevention of water becoming a speculative commodity. We believe that the waters of all streams should forever remain public property and that the rights to its use should inhere not in the individual or the ditch but in the land reclaimed.

WHEREAS, the perpetuation of the forests of the arid region is essential to the maintenance of the water supply for irrigation as well as the supply of timber for industrial needs.

Resolved, That the president of the United States be memorialized to so soon as a proper and adequate form of administration shall be provided withdraw from entry or sale under the act of congress of March 3, 1891, all public lands, which are of more value for their timber than for agriculture or for their minerals.

WHEREAS, The present public land laws, having developed under conditions where irrigation is not a necessity and having in their operation proved utterly unsuited to the conditions and the needs of the arid regions, and

WHEREAS, The present policy of divided control between state and nation of the public lands and waters of the arid region retards development, misleads settlers, hampers enterprise, and is responsible for rapid destruction of western forests and pasturages.

Resolved, That we favor the creation by congress of a commission of skilled and experienced persons to investigate the conditions now existing and to submit to congress such changes in our land laws as their investigations shall show to be desirable.

Resolved, That the executive committee be authorized to appoint a committee to proceed to Washington and urge the early creation of such a commission.

We favor construction at the earliest practicable date by general government of two reservoirs recently located under direction of United States engineer corps, one each in Colorado and Wyoming.

Resolved, That we commend all efforts looking to colonization of arid west and a creation of homes therein for worthy poor."

A resolution favoring postal savings banks was tabled. Resolutions thanking the local committees and newspapers and Senator Carey, who was the presiding officer and Chancellor MacLean, of the Nebraska University were also passed.

Senator J. M. Carey, of Wyoming, was elected chairman of the executive committee and Fred J. Mills, of Idaho, secretary, for the ensuing year.

The next Congress is to be held in Cheyenne, Wyoming, in 1898.

The following is the new national committee:

California, C. M. Heintz; Colorado, A. L. Kellogg; District of Columbia, E. F. Best; Idaho, F. J. Mills; Illinois, C. A. Parks; Kansas, J. A. Churchill; Kentucky, A. W. Pickering; Missouri, Thos. Knight; Minnesota, T. G. Frost; Michigan, O. E. McCutcheon; Montana, S. M. Emery; New Mexico, T. J. Clark; Nebraska, Matt Daugherty; Nevada, H. B. Maxson; Ohio, W. Lawrence; Oklahoma, H. E. Glazier; South Dakota, C. V. Gardner; Tennessee, Charles T. Harrison; Utah, H. L. Shurtliff; Wyoming, George East.

NOTES ON THE CONGRESS.

President Carey is to have full power to appoint a committee to go to Washington and try to secure irrigation legislation.

The number of delegates from outside the state limits present at the Lincoln congress according to the list published in Lincoln Journal was sixty-two.

Elwood Mead, the able state engineer of Wyoming, was present and exerted a great influence in restraining the congress from running after wild theories and illusions.

There seems to have been nothing said about state commissions to make local investigations. The commission system was one of the best things ever adopted at an irrigation congress and it seems a pity to allow it to fall into disuse.

The old officers of the irrigation congress struck their proper gait when they made as a leading feature of the congress an address on locating underground water by magnetic influence in order to enable an inventor to sell some alleged "magnetic machines" and made as another feature a paper on the exploded theory of "rain-making."

Chairman Moses' annual address teemed with allusions to the "grasping East" the "Solid South" the "Frigid North" and the "Wild and Woolly West" which he said would soon only be known in the history of the past as the country would be bound together in the bonds of irrigation, and closed with a grand peroration in favor of governmental aid for everything in sight.

The following comment is from the pen of Lute Wilcox the editor of the *Denver Field and Farm*:

"The irrigation congress last week was a beautiful failure and when the meeting was taken to Lincoln it came near being its uneral. The delegates did not enthuse, as no one had any faith in the corn husker's ideas of irrigation, entertainment or purpose, if they had ever had any. The old officers made such a bad mess of the whole thing that a new set of thoroughly western men had to be elected to save the

movement from absolute wreck and Judge Carey, of Wyoming, is the one man Moses who can lead the tribe out of the wilderness into which they drifted while following the corn planters.

VANDYKE'S BOOK ON IRRIGATION.

The Art of Irrigation, the exhaustive treatise on the practical handling of water on the ground, published in THE IRRIGATION AGE has been entirely rewritten by the author T. S. Van Dyke of California. It has been enlarged in its scope by adding some very important information on the selection of the means of irrigation. It has been condensed by the rejection of almost every superfluous word and it has been subheaded at every 150 or 200 words so that any one can in a minute put his finger on any portion he wishes.

The whole is now in what is called galley proof and is exactly as it will appear in book form. But the publication in book form is delayed by the difficulty of getting proper photographs to illustrate the many fine points the author wishes to bring out and he finds that he will have to take most of them himself. It is now in perfect shape to paste in a scrap book for use until the book form comes out.

The title has been changed to the Mystery and Mastery of Irrigation, or the Puzzling Details of Artificial Watering. The old title was not sufficiently suggestive of the difficulties encountered by the novice but the substance of most of the book is the same with those improvements that come from rewriting anything however good it may be.

It now makes a book of about forty thousand words and will be mailed to anyone in galley proof form on receipt of one dollar and fifty cents by the editor of THE AGE. A copy of the book in book form will be sent without further charge to the same address when issued but those who wish to study the subject in time for the next irrigating season had better not wait. There is no difference except in looks and convenience and if the next season should

be a dry one in the east you may wish you had mastered the subject in the winter. This is the first and only treatise on the actual handling of water in the field and from his twenty-two years of study and travel combined with much practical experience of his own Mr. Van Dyke at the request of THE IRRIGATION AGE has written a work that cannot be duplicated and that any one can understand.

HIGH PAY.

The lord-lieutenant of Ireland receives \$100,000 for his services and expenses.

The prince of Wales gets \$200,000 a year for the labor of being heir-apparent.

Italy pays her king \$2,600,000 a year in spite of the fact that she lost 10,000 men in Abyssinia.

The German emperor receives about \$4,000,000 a year besides the large revenues from estates belonging personally to the royal family.

Though the United States is such a wealthy nation our president receives the small salary of \$50,000 a year, and till 1873 it was but \$25,000.

If little Alfonso of Spain saves as he should he will be one of the richest monarchs in Europe when he comes of age, as the government allows him \$1,400,000 additional for family expenses.

The British government pays the royal family of England \$4,000,000 every year and of this the queen receives nearly \$2,000,000, besides her quarter of a million income from the duchy of Lancaster.

The czar of Russia owns in fee simple 1,000,000 square miles of cultivated land and has an income of \$12,000,000, although, as he is a despot, he can command the resources of the whole nation.

The president of France receives \$240,000 a year—a large salary, when it is remembered that the government is struggling under a debt of \$6,000,000,000, which is largest debt ever incurred by any nation.

COLORADO.

All the brooklets sing a song
In Colorado,
As they dash and purl along
In Colorado;
Notes of robin in the hay
Cheer till gloaming endeth day—
Only notes we cannot pay
In Colorado.
There is nothing that we lack
In Colorado,
Gay as crickets in a crack
In Colorado;
There is naught which doth not grow
Without aid of spade or hoe—
Soil's so rich we need not sow
In Colorado.
Nature played her ace and king
In Colorado,
Paens make the welkin ring
In Colorado;
And the mountain summit's brace—
Keeping heaven in its place—
Looming up with rugged grace
In Colorado.
Death declares his biz is dead
In Colorado,
We're not even sick abed
In Colorado;
And the doctor's earn their salt
From the transient blind and halt—
Say, 'tis healthy to a fault
In Colorado.
You should see the taters sprout
In Colorado,
Are so big we blast them out
In Colorado;
And they are so very nice
That they fetch an awful price
And are only sold by slice
In Colorado.
And the wheat stem is so thick
In Colorado,
That 'tis used for walking stick
In Colorado;
Tho' we have the proper clime,
Corn that only brings a dime
Is not worthy of our time
In Colorado.

FRANK E. PAGE.

CHICAGO TO DENVER.*Via Omaha and Lincoln, Nebraska.*

In 1867 the first railroad from Chicago to Omaha was completed, and it was considered fast time when the distance of 490 miles was covered in twenty-four hours. Now the same distance is run by the trains of the Chicago and Omaha line of the Chicago, Milwaukee and St. Paul Railway, in less than sixteen hours, and the whole distance of 1,069 miles from Chicago to Denver is run between 10 o'clock p. m. of one night and 7:45 a. m. the second morning.

The finest Sleeping Cars are run daily from Chicago through to Denver without change, making connections at Denver Union Depot with trains of all roads departing for principal points in Colorado, Utah, New Mexico, Nevada and California.

The Scenic Route of America is through "the heart of the Rockies" in Colorado, and the best route to Colorado is via the Chicago, Milwaukee and St. Paul Railway, by way of Omaha and Lincoln, Nebraska. City — C Ticket Office, 95 Adams street, Chicago.

FOUR MORE EXCURSIONS TO ARKANSAS AND TEXAS.

On November 2d and 16th, December 7th and 21st, the Cotton Belt Route will sell round-trip tickets from St. Louis, Cairo and Memphis to all points in Arkansas, Louisiana and Texas, at one fare, plus \$2.00, for the round trip. Stop-overs will be allowed on going trip within 15 days, and tickets will be good to return leaving destination within 21 days from date of sale.

The Cotton Belt passes directly through the best portions of Arkansas, Louisiana and Texas, and this will be a splendid opportunity for home-seekers to secure a good location.

For full particulars as to rates, etc., and for free copies of handsomely illustrated pamphlets regarding the Great Southwest write to E. W. LaBeaume, G. P. & T. A. St. Louis, Mo.

**A New Principle in Pumping
The Seaman Patent Pump**

Took first premium at the
ST. JOSEPH FAIR, 1895.

It is simple in construction and easy to run, requires less power than any other pump made.

Will raise from 80 to 20,000 gallons of water per minute, from 5 to 90 feet, at a very low expense. Full particulars mailed on application.

SEAMAN & SCHUSKE,

1604 Frederick Ave., St. Joseph Mo

**THE SHUART
IMPROVED EARTH GRADER
Solves the Problem**

Of rapidly, cheaply and easily grading land to perfect surface for irrigation. Saves water, time and labor; beautifies the farm and renders farming by irrigation both profitable and pleasant. Hundreds in use. Circulars describing machine and telling "How to Start Alfalfa" sent free. Address

B. F. SHUART, Mfr.,

AGENTS WANTED.

OBERLIN, O.

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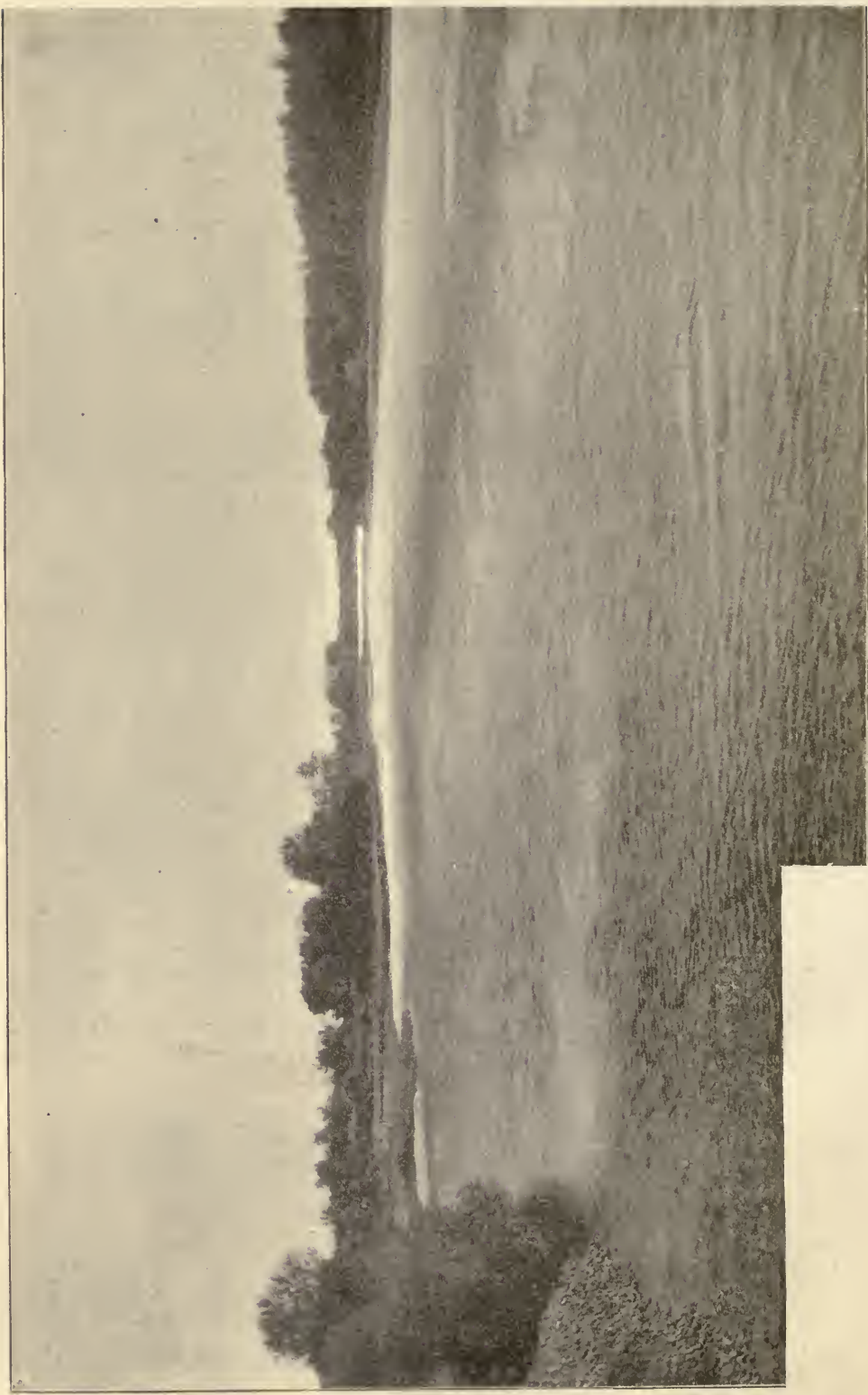
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NO. 3.

THE PROGRESS OF WESTERN AMERICA.

The Coming Session of the National Congress.

By the time this number of THE AGE reaches its readers the United States Congress will have convened at Washington. The coming session of congress promises to be an eventful one in many ways. That it will be a busy session is undoubted; that it will be fruitful of good is uncertain. Allowing a large percentage of time for bombastic speeches on Cuban freedom and similar topics there will still remain, however, a sufficiency of time, if properly utilized, to place upon the statute books much helpful and some very needful legislation. The inequalities of the tariff schedule enacted at the special session require attention and the insipid reciprocity clause in the Dingley bill should be eradicated immediately and replaced by one of some value to American farmers and manufacturers. Our producers have too long been accustomed to patiently knock at the door of Germany, France, England and other countries and uncomplainingly turn away when denied admission, except upon humiliating conditions. A reciprocity treaty that means reciprocity (not a jug handled affair—all on one side) is the need of the hour. The Nicaragua canal question is still unsettled and is fast slipping beyond American control. Its importance to the future of the West can not be measured in dollars and cents. The canal should and must be built and owned by the United States. The annexation of Hawaii should be made an accomplished

fact. There will be other important bills such as the postal savings bank bill and the bill to legalize railroad pools, which comes from the railroad associations. A revision of the patent laws, a bankruptcy system, additional restrictions upon immigration, national arbitration for labor difficulties and other measures that have been before congress from time to time will be again revived. The question of currency reform will occupy a very important position and will be discussed in all its phases. But no decisive action on this question can be anticipated as either side has the power to prevent action in the senate.

A Public Land Commission Suggested

But aside from these important matters which affect the welfare of all sections of the country—altho none more so than the West—there are questions of peculiar importance to the territory west of the Missouri river. Irrigation has been described as a combination of "Sunshine, soil and water" and of these the sunshine is not subject to the dictates of human law. But there remain the two—the land and the water. "That's the question" and sometimes it seems far removed from an answer of any kind. The Federal government owns the land while the states control the water supply and the resultant suffering falls upon the head of the innocent settler. The recent Irrigation Congress passed a resolution favoring the creation of a public land commission to investigate and study this particular

question and submit the results of its labors to the National Congress for further action. Such a commission, should congress see fit to create it, can accomplish much good, provided it does not become inoculated with the bureaucratic affliction. A judicious and business-like use of the funds placed at its disposal, under the control of competent men carefully selected will enable the commission to ascertain facts of untold value in the development of our vast public domain otherwise known as the "Arid Region." Such a commission, if it is to be of any lasting public benefit must enter upon its work in a strictly impartial manner, unprejudiced in favor of this or that theory and undisposed to direct its investigations into narrow channels with a view to appending the weight of governmental statistics to some preconceived private notion. The public's money should be used for the public's good. That the people's welfare demands a revision of the land laws is indisputable.

Wyoming Leads the Way The Wyoming Supreme Court on November 15, decided that foreign born residents, to be legally entitled to vote in that state, must be able to read the state constitution in English. Heretofore persons who could not read the constitution in English but could read a translation of it in their own language, have been allowed to vote. The immediate effect of this decision, which was unanimous on the part of the court, will be to disfranchise a large number of those who have heretofore voted, especially in the coal mining districts, and to replace a number of republican county officials who were given certificates of election by their democratic opponents. This may cause a little temporary hostility and disruption, but probably without any serious consequences.

It is in its broader aspects, however, that this decision conduces to a higher conception of American citizenship. It comes at a most opportune time and may even penetrate the case-hardened shells of the practical politicians, carrying with it

an inkling of the fact that the American people will no longer tolerate the indiscriminate naturalization of foreigners, for political purposes, without regard to their fitness for holding and using the precious boon of the elective franchise. Following as closely as it does the election of a mayor in Greater New York, where political rings reeking with corruption and rottenness are enabled by means of the votes of the naturalized, but densely ignorant foreigners, to extend and perpetrate their power for vice, sacrificing upon the altar of private greed, public welfare, health, morals, and every vestige of public decency, this unanimous decision of the Wyoming Supreme Court in favor of a higher and better standard of citizenship, will shine with the intensity of an electric beacon.

And it is not astonishing that this portentous warning to the politicians, indicative of a wide-spreading and rapidly strengthening popular sentiment on this most important subject, should be intoned by one of the newer states of the new West. The free air of the West inculcates a spirit of patriotism, broad, deep and enduring.

It is not the writer's intention to intimate in the slightest degree that all foreigners are unfitted to become American citizens. There are distinctions. The brutalized laborers imported by the coal mining and iron working corporations, especially during periods of labor troubles, should be classed with the Chinaman, and, if possible, effectually barred from the country, but at least prevented from becoming an important factor in both local and national politics. The details of the Wyoming case appear on another page in this issue.

Mexico's Rapid Development The long years of financial and industrial depression which we of the United States have enjoyed (?) most thoroughly seems to have had no counterpart in our sister republic on the south—Mexico. Every day adds its weight of testimony, that this vast and, hitherto, almost unknown country is being explored and its immense natural wealth being de-

veloped in a more rapid manner than even our rapid Americans are accustomed to. Foreign capital—British, German and American—is pouring into the “Free Silver” Republic in fabulous amounts. Over forty lines of railroad are now being built—not merely projected on paper. The largest smelter and the greatest brewery on the continent are now being erected and Armour is putting two million dollars into a meat packing establishment. New enterprises of every character are being introduced and developed. Every branch of industry is represented and all offer alluring inducements to capital and energy. Mexico seems to have been lying like a vast treasure store awaiting accidental discovery. That the republic is on the eve of a mighty leap forward can hardly be denied and what effect (propitious or detrimental) this burst of progress will entail upon the United States can not be accurately foreseen. That it will have an effect is unquestionable. What it will be is unknown.

Free Delivery of Mail in Rural Districts. The demand for free delivery of mail matter in rural districts is steadily and rapidly growing and it has been given a great impetus by Postmaster-General Gary in his report to the President. Mr. Gary reviews the few experiments in this direction made in selected localities and says that wherever tried, the approval of the rural communities has been most hearty and the value of the service greatly appreciated. The postmaster-general’s recommendation on this subject is very encouraging and congress should take steps to put the rural free delivery system into operation as soon as possible. No one thing will be so conducive to satisfaction with life on the farm as a daily or even tri-weekly delivery of mail matter, thus putting the farmer in close touch with current events, enabling him to attentively watch the market quotations for his products, and arousing an interest in all important questions. This movement should meet with generous support from the friends of irrigation because

it would be of direct benefit to the many small communities established and being established on irrigated land. The land companies especially should actively interest themselves in forwarding this movement as it would be a strikingly attractive inducement to city people who being accustomed to free delivery of mail hesitate about settling in country places where it is necessary to travel from five to twenty-five miles for letters and news of the outside world.

Ham. Hall on South Africa.

William Hammond Hall, formerly state engineer of California and who is well known to the readers of THE AGE through his series of able articles on the Principles of Irrigation which appeared a couple of years ago, has just returned to San Francisco from a long sojourn in South Africa. It was Mr. Hall’s cousin, William Hammond Hays, the American engineer who was arrested on a charge of conspiracy at the time of the Capt. Jameson raid. Mr. Hall is very enthusiastic on the subject of South Africa and he is not backward in expressing the opinion that this vast territory will advance very rapidly during the next few years especially in the matter of irrigation. Mr. Hall is to build for Cecil Rhodes a large system to water a fine tract of land in Bulawayo. In referring to this matter Mr. Hall said:

When I pointed out to him that there would not be a sufficient supply from the natural watershed, and that it would cost so much to bring water from another shed that the enterprise would not pay for many years, he replied:

“Never mind that. I want it done in order to show what can be done by irrigation in this country, how much it will cost and how the work ought to be done. Moreover, I shall be giving these natives work, supporting and civilizing them, and setting a good example to other capitalists and companies, and that is an object which will be worth all it will cost me, even if I make nothing.”

I could not help asking myself, Have

we any men in America who would build a large and expensive irrigation work out of their private fortunes, without hope of profit for the public good? Well, Rhodes is doing that sort of thing all the time. He seems to me also to manage the native question with admirable tact and judgement. The railway northward from Cape Colony through Bechuanaland, 1,000 miles or so in length, has been largely financed and managed in construction by Mr. Rhodes. He is also supplying most of the money for the telegraph line, which is being pushed northward across the Zambesi, through the the great lake country of central Africa, to join the Egyptian telegraph in the Soudan.

Mining Industry

The gold and diamond mining industries are immense and very impressive, although their development is only about twelve years old. California has had a half century of that development under favorable conditions, and yet we are just now entering upon a most prosperous era of gold production. So it seems to me that South Africa, with time and the removal of restrictions and difficulties, must show tremendous mineral resources. Vast areas of the Transvaal and Rhodesia and other parts of South Africa are known to be mineralized in the same general way as California, and the development of the mineral belt there is likely to pass through the same experience as here. The gold output of the Rand is not falling off, but is steadily increasing, notwithstanding the hampering conditions. There are fifteen dividend-paying mines on the Johannesburg Rand, but there are probably four times fifteen which could be made to pay dividends if the conditions were as favorable as they are in the United States.

South African politics and industrial development present one of the most interesting fields of study I ever entered. It is a field in which most colossal mistakes have been made, immense sacrifices have been suffered, and infernal injustices have

been inflicted." Mr. Hall expects to return to South Africa in about two months.

Government Control of Water

The whole country is dependent on irrigation and the conditions of rainfall and opportunities for storage are such as to indicate that irrigation, will be very successful. All the local colonial and state governments are actively interested in the subject. The Cape government constructs irrigation works, and having recouped the cost by the sale of its own lands served by the works, turns them over for use to the owners of the lands. It also subsidizes or encourages private irrigation enterprises in several ways, but it regulates and controls all works, and there no such thing as the unlicensed, unrestricted grabbing of water and construction of works which in the United States has done so much to prevent irrigation development.

There are magnificent lands for irrigation in South Africa, rich, deep soils which will raise any crop of fruits or grains which southern California can produce. As the seasons are the reverse of those of England, and of all the countries which supply England's markets, South Africa can always be sure of an ample market without competition. High class, delicate fruits can be put on the London market within fifteen days from Cape Colony, and at reasonable cost of transportation.

Why the Arizona Company Failed

The failure of the Arizona Improvement Company noticed elsewhere in this issue was not unexpected to those who have followed the career of this enterprise. The failure of this, the largest irrigation project in Arizona, is another instance of the futility of rapacious greed. Its history, with a few exceptions, is the general history of many irrigation enterprises. It obtained land for practically nothing and built an irrigation system to water it, purposing to sell the land and the water to settlers at many times the original cost, pocketing the tremendous profit for their "enterprise". Taking it for granted that the land could be readily

sold at highly remunerative prices the money was secured on bonds to build the system. But the sale of the lands did not follow the building of the canal as the projectors had anticipated; and after several years of unfruitful effort the property is placed in the hands of a receiver for the benefit of the bondholders, and the bondholders will be fortunate if they get back even a half of their investment. Except for the fact that this irrigation system was not complete, and never could be complete without the building of an immense storage reservoir at a cost of about a million dollars, and therefore the water supply was neither ample nor secure, it is a typical instance of greed—over-reaching the bounds of common sense and of business judgment. Had the price of the lands been placed at a reasonable figure and a moderate return upon the investment and risk been considered sufficient, there is little doubt that a greater acreage would have been disposed of, more settlers secured and the increased return from the sales and the rental of the water would have carried the company financially. The success of all irrigation enterprises outside of an adequate water supply for fertile land, depends upon settlers. Without purchases of land and water, failure is inevitable, and the settler can no longer be deluded with the statement that the higher the price of the land the greater its value to him. Honest values based upon a reasonable cost of the land and the water system, with a due regard to a reasonable profit upon the productivity and earning capacity of the land, are demanded, and the land and irrigation companies which disregard these self evident signs of the times cannot expect to escape punishment for their business sins.

Advertising an Absolute Necessity. And another important matter which the land and irrigation companies have intentionally overlooked is the value of advertising. The failure, financially of irrigation companies, one after another, including nearly all of the largest systems in the country, has clearly

demonstrated that the investment is far from being complete when the land is purchased and the water system built. A necessary element of success is lacking—the settler to buy and occupy the land and use the water. Even a high priced article can be sold if it is extensively advertised, but a man offering something for nothing is limited to his acquaintances without the aid of the newspapers. Land advertising is one of the most difficult of all branches of this most useful art and every department of the science of publicity requires thoughtful, intelligent care and a large experience. The settler can not be secured unless he is informed of the opportunities offered.

If the manufacturers of machinery and other heavy and expensive articles (to say nothing of patent medicines and soaps) can profitably afford to spend hundreds of thousands of dollars yearly in acquainting the public with the characteristic names of their products, it is not unreasonable to presume that a land company, with its larger percentage of profit on each transaction, could advantageously imitate their example. In either case the advertising must be succeeded by personal solicitation—the manufacturers by a “drummer” and the land company by a local or traveling agent. A not excessively large appropriation of money judiciously expended in advertising will yield much greater returns than the ordinary land “boomer” believes or ever suspects. The verity of this statement has been proven.

Westward They Go. The effect of the devastating epidemic of yellow fever to which the South has just been subjected will be particularly noticeable in immigration affairs during the next two years. The tide of homeseekers which has been steadily flowing Southward will be turned, by the fear of the plague, toward the West. Already the indications point to a large movement of population beginning with the early spring. The chiefs of the traffic departments of great western railroads are looking forward with pleasureable feelings

to this anticipated tide of settlers. And while the railroads will reap the first profit the land and irrigation companies will not be far behind and the ultimate results will be immeasurably for good in all lines of industry. There are broad grounds for predicting this rush of homeseekers Westward. The feeling of unrest and apprehension, which has been uppermost in the minds of the great middle classes during the past years of financial and industrial depression is about to be strongly emphasized by a wide-spread effort on the part of individuals to secure each for himself, more stable and unchangeable conditions of livelihood. And this naturally turns those who have been amenable to the fitful periods of prosperity and depression in the cities toward the irrigated region where a generous living and more can be extracted from Mother Nature's bosom at all times, and while the ingredients of this movement are individuals, each striving for himself, the effect is that of a grand army marching forward to conquest. The South's great misfortune was the only thing needful to deflect into western channels practically all of this broad stream of hopeful homeseekers, and they will not seek in vain.

Colorado to the Front.

Never was state in a better condition for an era of prosperity than is Colorado today. It needs but the striking of the hour when every material element will contribute its quota to the rising flood of general good fortune. Agriculture and mining, the two most important industries, are standing on the verge of a tremendous advancement. The existant irrigation systems have been tested and their capabilities ascertained. The enterprises having an inherent weakness, such as unfavorable location, unproductive soil, or insufficient water are known and frowned upon, while public confidence is strengthened in legitimate enterprises honestly conducted. The heavy fall of snow in the mountains assures an ample water supply for the next irrigating season and it also means plenty

of grass on the open ranges, conferring untold benefits upon the cattle and sheep men. Mining for the precious metals, coal, iron and other minerals is being prosecuted with greater vigor than ever before and the opening of spring will witness thousands of men scouring the mountain sides prospecting. Mining excitement is steadily increasing. Several new lines of railroad are projected and work on them will be commenced when the snow disappears. Taken altogether the horizon is certainly brightly shining with the promise of a glorious day.

Co-operative Fruit Marketing. The success of the California system of co-operative fruit marketing is being distinctly evidenced with each successive season. This year the revolt against the domination of the commission man is more forcibly enunciated than ever before. The organization of Farmers Clubs, Citrus Unions, Fruit Exchanges, Fruit Growers and Shippers Ass'ns goes on unceasingly, and all with the avowed object of obtaining for the producer his share of the profits. The commission system is the worst of the pests which the fruit grower has to combat and it must be eradicated before success is possible. The middleman is a parasitic growth obstructing free intercourse between the producer and the consumer and exacting tribute from both. The California Exchange system, which was carefully reviewed in the pages of this magazine two years ago by Fred L. Alles, of Los Angeles, is co-operative inasmuch as it places in the control of the fruit growers themselves, the packing, shipping and selling of the products of their orchards. The expense is about one-fourth that of the commission system and this saving goes to the bank accounts of the producers. The operation of the California system has been eagerly watched and now that its success has been conclusively manifested it is being rapidly adopted in other states. Colorado and Idaho were not slow to perceive the value of this method and now Oregon has fallen into line. Within a few years at the most but

a small proportion of the fruit grown will be marketed in the old way. The commission men will be obliged to search for other occupations.

Sugar Beets in the East

One of the substantial signs of the times is the widespread interest manifested in the growth of sugar beets, especially throughout the states east of the Mississippi river. Through the able efforts of the Secretary of Agriculture beet seeds were distributed among the farmers in practically every locality where there was any expectation of reasonable success and the reports concerning yields and percentages of saccharine matter and comparative purity are now being compiled and tabulated for publication. Until the full returns are at hand it is impossible to predicate definite conclusions but from the meager information now obtainable it would appear that these experimental efforts have confirmed the expectations of the projectors and that the cultivation of the beet is commercially profitable. A number of beet sugar factories are projected and undoubtedly some of them will be erected and placed in operation in time for next season's crop. The progressive tendency of the period is to supply, to the greatest possible limit, the demand for domestic production and one of the widest fields for the practice of this self-evident economy is within the domain of the sugar baron. The generous attention accorded this subject in the Eastern states can but have a salutary effect upon its development in the West, where climatic conditions are much more favorable toward the ripening of the beets and the secretion of the saccharine properties, and the anticipated result will be a decided acceleration of the sugar beet industry in the Arid Region. With its manifold natural advantages this region will, and in fact already is, strongly attracting both the growers and the manufacturers.

Steady Progress

In no department of journalism has there been a greater advance, both as to the number of its rep-

resentatives and the character of its contents, than in the agricultural and horticultural press. Within the past thirty years even those which were thought in the earlier days to be the best possible, have introduced improvements of great importance, and have kept well abreast the times in every respect. They have been, and are a vast power for good. They disseminate information which affects the material and social welfare of the largest single class of our population, and are now commanding and liberally compensating a high order of talent.

BEE KEEPERS MEETING.

The Northwestern Bee Keepers Society held its first session in five years, at the Briggs House, Chicago, about the middle of November.

A reorganization was accomplished by electing as president Dr. C. C. Miller, of Marengo, Ill. George W. York, editor of the Bee Journal, Chicago, was made secretary and treasurer.

A resolution was adopted asking the United States Beekeepers' union to request congress to pass a bill the object of which should be to prevent the adulteration of honey.

Among the beekeepers was E. Whitcomb of Friend, Neb., whose facial resemblance to Mark Hanna brought him at all times a respectful hearing as well as many jests from his brother beekeepers. Mr. Whitcomb is commissioner of apiculture for the Trans-Mississippi exposition at Omaha, and his business in Chicago was to induce Illinois beekeepers to make an exhibit there. Other well-known bee men were James A. Stone of Bradford, Ill.; John Nou of Marshalltown, Iowa; Dr. H. Besse of Delaware, O.; E. F. Schaper of Chesterton, Ind.; M. M. Baldrige of St. Charles, Ill.; George Thompson of Genoa, Ill.; Miss Mathilda Candler of Cassville, Wis.; James A. Green of Ottawa, Ill.

Advise to girls—Keep your powder dry if you are gunning for a husband.

A GRAIN FIELD ON IRRIGATED RANCH.



WHAT IRRIGATION DOES



THE DRAINING DISTANCE OF UNDERGROUND WATER.

A PRACTICAL DEMONSTRATION OF THE EFFECTS OF UNDERFLOW DEVELOPMENT.

BY T. S. VAN DYKE.

THE reliable nature of most of the underground water supply of Southern California has been well proved by a recent series of three years of short rainfall in which two were a little below half the average and the other one just about the average, with bad distribution. This was a very severe test, but every draining work that was in any kind of proper ground stood it with scarcely a sign of diminution. Much of the water supply of the future elsewhere, as well as in California, will be of the same nature, though there is nothing about which it is so easy to be deceived as the amount of water that may be had in this way.

The common impression is that a draining flume or tunnel draws from a level all around it, the level being gradually lowered from its natural elevation down to a certain point at which it continues to stand. An expert who would think a few minutes would say that such would not be the case if the water were in motion at all, or had a regular supply, and that if it did not have such a supply it must in time drain out and could not reach any level at which it would stand continuously. But very little in the line of demonstration of this principle has ever been done, and it is a very important one for all interested in water development to understand. In a recent case in the Superior Court of Los Angeles in which I was engaged to study up the case as an expert witness, we had the only complete proof of it that I have been able to find in the Southwest.

A PRACTICAL DEMONSTRATION.

In December, 1895, the West Los Angeles Water Company made a cut some two thousand feet long and eighteen feet deep at the upper end. A flume was laid in the bottom from which nearly five hundred inches of water have been flowing ever since and almost unaffected by the series of short years. During the two months the cut was making, and the water increasing every day, several wells on places from a thousand to two thousand feet up stream showed a gradual fall of their water level, which amounted in the two months to four feet. In June, 1896, an extension was made which took six weeks and resulted in developing more water at about the same rate as that in the main flume. During this six weeks the water in the well sank sixteen inches.

The fall of water in the wells was marked by nails driven in the curbing every week during each of the periods and was sworn to by a number of witnesses. I and the other witnesses for the Company examined them with care and concluded they were genuine, and there is no reason to believe that we were mistaken. On the trial of *Yarwood et al. vs. the West Los Angeles Water Co.* these facts stood uncontradicted.

Here was a *prima facie* case that would make many a lawyer smile and some extra strong fighting had to be done to win it. It was accomplished by proving the following principles so that the court, like all others, had been first convinced by the *prima*

facie showing of the wells, had to come to the conclusion that the plaintiffs had failed to prove their case.

The land was common farming land with no sign of water on surface. To sustain their case plaintiffs had to base it on riparian ownership of an underground stream. For if it were a stationary sheet then it would be percolating water and belong to the owner of the land, the company.

We at once claimed that if in motion at all it must have a supply and a discharge, no matter what its shape or rate of motion. For if it had no discharge it would rise to the surface somewhere at the lower end, it being all open gravelly soil with no sheets of tight material that could cut off water. And if it had no supply it would run out and leave the underground bed all dry.

Having a discharge and supply it became in all respects like a flume or open aqueduct above ground but filled with sand. Such a flume with a capacity of one hundred inches will run full to within a few inches of the lower end when it drops off in the well known curve. The radius of this curve depends on the depth of the water. In no way can you make its effect reach back of a certain point.

Now fill the flume with sand or gravel until it will carry but one inch. The result is in no way changed except that the curve will depend mainly if not wholly upon the resisting nature of the material instead of on the volume of the water. In any event it will not vary much from the curve in water alone and is the same curve slightly changed by the new conditions. In no way can this be changed except by altering the material or the supply from above. You may enlarge the outlet in any way, or break off section after section of the flume, the same curve will be there and cannot be extended back of a few feet from the end and often only a few inches.

PRINCIPLE OF UNDERGROUND STREAMS.

The application of this principle to an underground stream was certain. Moving water whether in the form of a stream, or a series of streams, or in a sheet, depends

on the same principles; so much supply from above, so much gravity tending to draw it down the slope of the country, so much friction tending to hold it back. It could no more escape the influence of friction than it could that of gravity, and no mode of facilitating the discharge could make the supply from above move any faster against the friction of the gravel and sand through which it had to travel a thousand feet or more from the nearest land of the plaintiffs to the drainage flume of the defendant. The plane of the surface slope of the underground sheet would continue, the same as in the flume filled with sand, until near the outlet when it would drop off more rapidly. But this dropping would extend back but a short distance and four hundred feet was the longest estimate made by any of us.

A curious confirmation was at hand. If the water fell four feet in two months over an area of some five hundred acres because of the flume and cut it must then have gone into the cut. It was easy to calculate that such a fall on such an area in such a time would have equalled about five hundred inches steady flow during that time. And this must have been in addition to the five hundred inches which continued to flow eighteen months after the cut was made and the wells had fallen. The same was the case with the cut for the extension. The fall of sixteen inches during that time called for a flow of nearly two hundred inches in the extension cut during the six weeks it was building. And this would be in addition to the amount that has ever since been flowing from it. The flow in both should have been about double during the falling of the water in the wells.

What became of this water if such were the case? The builders of the flume and cut had a weir on all the time, taking the measurement every day of its progress before there was any lawsuit dreamed of and they never discovered it. The plaintiffs had evidently been laying their plans for a lawsuit from the first, were living within

half a mile of the cut, were never prevented from making all the examinations and measurements they chose, and they never discovered it; for they offered no evidence of any extra flow in the cut or extension during the time the wells were falling. If there had been any such increase they would certainly have known it and measured it, for they were prepared with all other measurements.

PROVEN BY WELLS.

The case was clear enough to me and the other engineers engaged on the investigation, but we decided that it was too important to rest on any opinions or presumptions. So we bored a line of wells toward the right corner of the plaintiffs land and another toward the west and joined them together in a large triangle, from the corners and sides of which we ran out some spurs. There were some fifty in all, covering the ground between the cut and the land of plaintiffs very thoroughly. The level of the water in all the wells was then taken with care and the whole plotted. It was found that the curve made by the cut ran out in about two hundred and fifty feet and at three hundred became imperceptible to the most careful levelling. From there to the land of the plaintiffs, over seven hundred feet to the nearest, the surface of the water sheet was a perfect plane corresponding to the slope of the country the same as elsewhere in the valley. The lowering of the wells must have been from failure of the supply, though why it should fail in just that way is a mystery that will never be solved. The water level was affected all over the valley by the series of dry years but nowhere else was there any such astonishing coincidence as here.

The profile shows the cut and flume lying in a trough of depression with the sheet of water rising again on the other side and continuing on the slope of the country. This we proved with wells beyond question and in one place where there was a little side flume about 100 feet away the water level between them was two feet above that in either flume. The large flume and cut

does not drain but merely taps the moving sheet. Its effect is gone inside of three hundred feet. Its effect is merely to lower the sheet within those limits and this it does with a slope that forms a cone of depression around it.

The conclusion is that where the water supply is large and steady through a large amount of porous material it cannot be reduced more than so much by any one drain. Hence in many cases there is much more water in an underground supply than we would expect to find. Water may also escape its influence on the sides and in many kinds of material need not be very far from the drain to do it. We see exactly the same results in a canal I have been building on the Mojave river though we have not tested the matter with wells. It is plain enough in other ways, such as large flowing lagunas a short distance above, standing at the same level as before, though an underground flume has been drawing over five hundred inches for nearly two years and twice the amount is struggling to enter the flume but, cannot because the bottom which was at first put in to save any question of scour has not yet been taken out.

If however the supply is a large stationary sheet an increase in the number of drains will only hasten its end. Such is the nature of too much underground water. It is not perfectly stationary but very nearly so and the supply is very light. More drains may only cost more money without getting much more water. The rate of passage of water through gravel and sand is vastly overestimated and great care should be taken in investigating the conditions of such a project. But where found in a sufficient supply from an ample watershed and on a good drainage line through good material an underflow will surpass the surface flow as a steady source of supply as much as irrigation surpasses rain. California has now proved that beyond possibility of escape.

THE MODERN FARM.

BY JOEL SHOEMAKER.

THE Modern farm differs very materially from the old broad expanse of timbered hills and grassy prairies. In former days our fathers owned up the hill and down the hollows, across the woods and over the creeks and rivers. The old homestead included many hundred acres untouched by ax or plow and valuable only for gratifying the desire for possession and increasing the annual amount of taxation. Almost every person brought up on the farm of twenty years ago has fond remembrances of the great woods, filled with nuts and grapes, the big pastures of blackberries and hazel bushes and the immense prairies, the homes of wild fowl, crafty wolves and fleet foxes.

But the farm of today shows few of the old landmarks and the future will make more wonderful changes. The tillable area has been divided and subdivided until there are in round numbers five million families in the United States occupying farms of varying dimension. This number is a little over one-third of the entire family population and practically represents the food producers of the country. When the farm products are scarce the whole people suffer and the one-third must extend aid and sympathy to the two thirds living in the cities or employed in other industrial pursuits. The farm being the base of food supplies is therefore the most important subject for consideration by our thirteen million families, constituting the population of the nation.

Any system of farming that will increase the soil production in ratio with the multiplying population is that most desired by all and the new agriculture—founded on modern irrigation—is destined to fill all the requirements and furnish a

remedy for the evils of an many of the unemployed. Small farms under close cultivation produce more than four times the area did by old methods, and diversified crops yield better returns than former special farming of large sections. With the practice of irrigation began an era of better cultivation, which will no doubt become universal, especially in the western half of the United States. In the irrigated sections a twenty-acre farm has fully demonstrated its capabilities of producing sufficient fruits, vegetables, cereals and meats, for supporting a large family in luxury and giving its share to the world's food supply.

This modern farm may be divided into the following convenient areas or fields. The house and barn should occupy one acre, bordering on a public highway. The barnyard and corral, fronting on road would have ample room on one acre. An orchard should occupy five acres in which all varieties of fruits can be growing and have a small corner left for the poultry house and yard. Three acres sown to alfalfa or other grasses and cut two or three times each season would furnish enough hay for horses, cattle and sheep. A similar area enclosed separately and rotating with the hay field should be sown to mixed grasses and used as a permanent pasture. The remainder will be sufficient for one man to cultivate after attending to the other divisions. Larger farms can be divided in a similar manner and every parcel except that allotted for house and barn ought to yield a handsome surplus every year.

THE BARNYARD.

The barnyard of most western farms has been much neglected in the past because

of the stock being kept on the eminent domain of the mountains and valleys, owned and occupied by none but temporary herders. But the new agriculture is rapidly changing conditions and many well appointed barns with suitable surroundings have been constructed in the last few years. Men have learned that good stock well fed and properly housed yield better returns than scrubs or natives left to range upon the free government pastures.

Thus a range sheep may be worth two dollars and shear five pounds of common wool, while a farm kept sheep will be worth four dollars and yield ten pounds of fine wool.

GOOD WATER.

Pure water is necessary for all animals and many diseases are traceable to neglect in supplying the water regularly or forcing the dumb animals to drink that which is unclean. Water should always be kept in a trough in the barnyard, as a man often wastes much time and loses his temper in chasing after stock turned out to the creek or ditch to drink. A flowing well is the proper thing and can frequently be obtained very cheaply, but all farms are not located in artesian basins. If the underflow of a stream or the sheet water of the plain can be tapped an ordinary ten foot windmill serves the purpose of a water lifter and does duty at but little cost. Where rain water is stored in cisterns it becomes unwholesome unless considerable lime or salt is occasionally thrown into it.

CARE OF HORSES.

The Horse is one of the farm necessities whose value cannot be reckoned in dollars and cents if he is true and trusty. When a man has found a good team he seldom makes anything by trading for new ones, even though he seems to drive a splendid bargain financially. Horses demand warm stables, pure food, clean water, plenty of exercise and careful handling while in the stable or harness. Common sense loading loose check reins and open bridles without

blinds, and kind treatment are some of the methods of making gentle and trusty horses.

HORSE FEED.

Hay forms the basis of much of the western feeding and consists chiefly of alfalfa. This is supposed to be all the feed required when horses are not worked every day. But horses require grain as well as hay and a change in the ration at least once a week. The ration varies with the temperature of the stable and amount of labor to be performed as well as with the altitude and climatic conditions. A ration of fifteen pounds of hay and twelve quarts of oats per day is considered sufficient under ordinary circumstances for a moderately worked horse.

Corn is better crushed and from three to six quarts daily is a good ration when plenty of hay is given. The hay is best cut in short pieces by a cutting mill which should occupy a place in every barn. Frequent mixtures of warm bran and cut hay are relished and insure better health.

THE ORCHARD.

An orchard of five acres or more should be planted by the new farmer as soon as he can clear the land or is able to purchase trees for land already in condition. The trees of every variety grow in value yearly until the wise man can sit in the shade during his declining years and enjoy the comforts of life from the products of his orchard. When the land is properly leveled before planting and sufficient water for irrigation is assured, fruit trees of every variety may be expected to begin bearing in from three to ten years and continue fruiting annually while the planter lives. They require pruning, cultivation, irrigation and spraying but reward their owners many fold before ceasing to bear.

THE FRUIT TREES.

Fruit trees should be planted in squares if possible, with several of the same species in each line or cluster. This is necessary for convenience in pruning, spraying and harvesting the fruit and to insure

perfect pollenizing or mixing of the flower dust, so that all the trees will bear. Apples are generally planted at a distance of from 25 to 30 feet apart according to the kind of fruit. Early fruits do not have so large trees as late and can therefore be planted closer. Pears and cherries require a space of 16 to 20 feet between trees. Plums are almost certain croppers if planted 15 feet apart, but most varieties do better in clusters as close as 8 feet without regard to uniformity of rows. Peaches, nectarines, apricots and quinces may range from 10 to 16 feet between rows and yield abundantly.

In planting an orchard or vineyard the following table of distances and numbers of trees vines and plants may be beneficial.

Apples, 30 feet apart each way, 50 trees to acre; Pears and cherries, 20 feet apart, each way, 110 trees to acre; Plums, apricots and neectarines, 15 feet apart, 205 trees to acre; Grapes, 8 feet each way, 680 trees to acre; Currants and gooseberries, 3 feet each way, 4,840 to acre; Raspberries, and blackberries, 4 feet each way, 2,723 to acre.

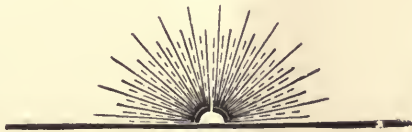
IRRIGATING FRUITS.

An orchard may be irrigated in different ways with varying results, depending on the nature of the soil, the amount of water applied and the number of times irrigated during the growing season. If water is used too often or neglected and left to sun too long in one place it will

form an artificial lake between the surface and subsoils and endanger the life of the trees. When the leaves begin to turn yellow in midsummer and the orchard has the appearance of dying prematurely the farmer may safely conclude that he has used too much water. The remedy for this water disease is to dig round the roots and tap the mud pools formed in subsurface strata. Trees will not grow and but seldom bear good fruit if over irrigated.

THE GARDEN.

The garden spot is a very much neglected part of a majority of western farms. There seems to be a prevailing idea that gardening is but small play for women and does not pay for the labor involved. The gardens are frequently small coops containing a few gooseberry and currant bushes with rhubarb and horseradish roots planted along a walk through the center. A small bed is spaded up on either side and the little garden truck is grown under the most trying difficulties. If an acre is used for the garden and all kinds of vegetables grown for home and market, the farmer will learn from an experience of one year that he has been deceived as to the value of the truck patch. Fertilizers are necessary for all vegetables and can be obtained from the orchard leaves, the stable manure and the rotted straw of the stock yard. Coarse manure is more detrimental than beneficial and should not be used in the garden.



THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs. Also sketches or plans of convenient and commodious barns, hen houses, corn cribs etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

SURPRISING FIGURES OF AGRICULTURAL IMPORTS.

BY W. C. FITZSIMMONS.

Probably nine-tenths of the people of the United States have no proper conception of the vast annual importations into the United States of purely agricultural products. We are distinctively an agricultural nation and always have been. We had in 1890, 4,561,641 farms, comprising 623,218-619 acres, of which 57.4 per cent were under cultivation, and yet we continue, year after year, to import enormous quantities of products from other countries which might be grown with profit on nearly every farm in America. Especial attention is invited to the following remarkable table prepared by the Department of Agriculture for the year ending with June.

This table shows that more than 50 per cent of all our imports are of agricultural products. While we can never hope to produce a home supply of coffee or cocoa, yet all the sugar products, all animals and their products, all fibres and nearly all the miscellaneous articles mentioned in connection with the above table, can be and ought to be produced in the United States. Among the "miscellaneous" items is that of wine, for which we have paid foreigners \$35,896,394 during the past four years, \$16,631,130 being for still wine easily produced of as good quality in California, the balance being for Champagne. During

the four years under review the beans and peas imported cost \$5,888,592; potatoes,

IMPORTS OF AGRICULTURAL PRODUCTS.

	1891	1892	1893	1894
Sugar and molasses.....	\$108,380,341	\$107,286,537	\$108,248,118	\$128,836,607
Coffee, tea and cocoa.....	113,373,621	145,738,771	98,544,510	107,115,280
Animals and their products except wool.....	43,277,970	39,913,808	42,244,073	25,407,813
Fibers, animal and vegetable.....	61,429,517	67,089,048	76,961,520	37,602,388
Miscellaneous.....	82,591,497	66,811,677	78,892,969	58,064,517
Total agricultural.....	409,081,946	430,859,891	414,891,190	357,646,675
Total imports of all kinds.....	844,916,196	827,402,492	866,406,922	654,994,622
Per cent of agricultural matter.....	48.4	51.6	47.3	54.6

\$6,327,716; rice, \$12,755,409 and tobacco, \$39,307,343. All these products can be raised by our own farmers in the greatest abundance, and while they are scratching

their heads and wondering why they have made little or nothing on wheat during the past five years, they may very properly reflect upon the story which the above figures tells in a very loud voice to all farmers who have the inclination to listen to them and the business acumen to profit by their lesson.

WHEAT BY IRRIGATION.

BY JOHN G. HALL.
(In Edgemont Express).

ON account of the low price that wheat has been sold for the last few years, and in order that the farmer may make a profit on his labor in raising by irrigation, which adds greatly to the cost of production, he must realize large returns from a small acreage. Consequently great care must be taken to place the land in the best possible condition before the seed is sown, by plowing deep and pulverizing the soil, and having the surface in a smooth condition to receive the water from the lateral easily, evenly and uniformly. Then sow the grain, after being immersed in blue vitriol water to kill the smut, as early after February 1 as frost will permit. This applies to spring wheat. The best implement for the purpose up to the present is the press drill. If the soil is in the shape it should be, the seed can be deposited in the ground and the moist earth packed firmly upon it, when the seed will sprout and take root before the ground has time to dry out. While a drill costs more than any other seeder, it is at the same time the cheapest. Why? Because 60 pounds of seed per acre will secure as good a stand with a press drill as will 90 pounds with a hoe drill. This is due to the earth being packed upon the seed, and not allowed to dry out. Ninety pounds with a hoe drill will secure as good a stand as will 120 pounds broadcast. Why is this? Because the seed sown broadcast is sown above the moisture. A large per cent fails to get covered, a certain portion is picked up by birds, and still another portion is lost for want of moisture to sprout it.

KIND OF SEED TO SOW.

Great experimenting has been done with various kinds of seed and too much care can not be taken in the selection of the same, as only a small per cent of the varieties tried do well under irrigation. From long experimenting with wheat under irrigation in Colorado, the writer is partial to two varieties, viz: White Australian and Defiance. I think both of these varieties would be particularly adapted to the soil and climate of Fall River county. The Defiance variety is the miller's choice and brings a higher price in the market. Why? Because it makes three pounds more flour to the bushel than any other variety grown in the west. If this is true of Defiance, why do you uphold the Australian variety? Although it is softer wheat, yet under the same conditions it yields from two to eight bushels more than Defiance. Therefore if the farmer has to take five cents per hundred less for Australian, with this yield he is still ahead. Either of these varieties will stand until fully ripe, and stand to be handled without shelling to any great extent.

WHEN TO IRRIGATE.

I will only speak of this under favorable conditions, but different conditions make exceptions to this rule. When the soil is in the best of condition and the season favorable, the first irrigation should take place when the grain becomes a solid mat upon the ground, and is stooling; if thoroughly and carefully irrigated at this time it should carry it along until the head shoots out and the berry is forming, then it should be thoroughly soaked again to give plumpness to the berry and make the head fill well. Under the most favorable conditions this will make a wheat crop that will yield from 30 to 60 bushels per acre, if the soil is fertile enough to produce it.

PINEAPPLES IN FLORIDA.

Thus far California has not produced pineapples in commercial quantities, but efforts in this direction have been put

forth during the past four or five years in San Diego county and some other parts of the state. Probably nowhere within the limits of California are the outdoor conditions of climate entirely adapted to the successful production of pines. In a few places here and there, sheltered from frost and wind, they may be grown in the open to a limited extent, but not otherwise. Protected by "sheds" however, as is customary in certain parts of Florida, the pine could doubtless be made a profitable crop in California. The pineapple sheds of Florida are merely coverings made of narrow laths erected upon posts six or seven feet in height. The sides are also lathed with strips an inch or so apart, the same as the top. The design is to protect from frost and wind, while yet allowing enough sunshine for growth and development.

It is alleged that one shed near Orlando, the county seat of Orange county, Florida, covers six acres of ground and contains 60,000 pineapple plants. Certainly 10,000 plants upon one acre would seem to be too many for best results, and the great outdoor plantations along the southern coast of Florida, as well as in the tropics, should seldom, if ever, contain more than half that number of plants per acre.

The pineapple is so named from its general resemblance to pine cone, and belongs botanically, to the Bromellaceæ, to which long moss also belongs, and such plants are said by botanists to be able to subsist as air plants without contact with the earth. However this may be, the pineapple thrives best in a good soil and with considerable cultivation and care. The plants seldom grow to a height of more than four feet and the average height in a well cultivated plantation is probably about three feet. Pineapple fields in Southern Florida have been known to yield crops worth \$1,000 per acre. But this is not common.

PASTURE FOR PIGS.

Exercise, good air and sunshine play a much greater part in pig raising than most

people commonly suppose. It is for this reason that the western practice of relying quite largely on grazing for the nourishment of swine is so successful.

This has never been so clearly demonstrated as by a series of pig feeding tests extending over four years, made by Mr. A. A. Mills of Utah. We give the result below:

1. Pigs allowed to run at large over 18 acres of good pasture and fed a full ration of grain made the most rapid growth and required the least grain for one pound of gain.

2. Pigs confined in movable pens in the pasture grow more slowly than those running loose, and require an increase of 20 per cent of grain to make one pound of growth.

3. Pigs at pasture, fed under three different conditions, gained 92 per cent more and ate but two per cent more than the pigs getting grass and otherwise similarly fed but confined in pens. The grain required to produce one pound of gain was increased 40 per cent with those in pens over those in pasture.

4. Pigs fed but part rations of grain at pasture made satisfactory gains. Those at pasture getting the three-fourths grain ration gained more than those fed a full grain ration and grass, either in the yard or in the pens.

5. Pigs pastured without grain made about the same growth for three seasons in succession, this averaging .36 of a pound a day.

6. As nearly as can be judged, exercise alone increased the gain 22 per cent., and the amount eaten but 1.5 per cent., but decreased the amount required for one pound gain 22 per cent.

7. Grass when cut and fed green to pigs, whether fed in pens or yards, or with full or part grain rations, or without grain, proved to be of very little value.

8. Pigs confined in pens and fed on grass alone, mostly lucerne, for 91 days, lost over a quarter of a pound per day.

9. The average of the pigs fed on grass

gained a little more than those without the grass, but not enough to pay for the extra feed in the grass.

10. With the pigs confined in the hog house pens, the grass proved beneficial, while with those in the yard it proved detrimental, the latter requiring more grain to make a pound of pork with the grass than without it.

11. Pasturing either with full or with part grain rations appeared to be by far the cheapest and best way of making pork.

THE BUSINESS HEN.

In 1890 there were in this country 258,-871,125 chickens and 26,738,315 other fowls. In that year the hens laid, 9,836,-674,922 eggs. There are now about 350,-000,000 chickens which will produce 13,-750,000,000 eggs worth at least, \$165,000,-000; and the poultry meat sold during the year will bring \$125,000,000, which gives a total of \$290,000,000 as an estimate of the earnings of the American hen for one year. The 350,000,000 chickens are worth \$105,000,000.

Compare the poultry product with the following:

Value of silver production, \$72,510,000; value of wool clip, \$38,146,459; value of all sheep, \$65,167,725; value of all swine, \$186,529,745; value of mules, \$103,204,-457; value of horses, \$500,140,186; value of petroleum products, \$62,383,403; value of potato crop, \$78,984,901; value of tobacco crop, \$35,574,220; value of cotton crop, \$259,164,640; value of oat crop, \$163,655,068; value of wheat crop, \$237,-938,998; imports of coffee one year, \$84,-793,124; imports of tea one year, \$12,704,-440; total of pensions, \$139,280,078; total of school expenditures, \$178,215,556; total interest on mortgages, \$76,728,077; cost of Post Office Department, \$90,626,206; net earnings of railroads, \$323,196,454; dividends on railroad stocks, \$18,365,774.

The values of all gold produced in American mines in 1895 was \$46,610,000, and of all silver \$72,051,000. The value of all minerals, including iron, gold, and silver,

taken out of American mines in 1894 was \$208,168,768. Americans are given to bragging about our immense mineral resources, and yet you will notice that the hens paid for it all in one year and had enough left to just about pay the interest on all mortgages.

COST OF EGG PRODUCTION.

Estimates have placed the cost of a dozen eggs at as high as 12 cent, but some experimenters find the cost to be 6 cents. At the experiment stations, where every pound of food is weighed and but little waste material can be used the cost is greater than the average on the farms. It has long been accepted among poultrymen that five pecks of corn or wheat, or the equivalent thereof, will maintain a laying hen one year. At present prices this would be about 65 cents a year. We do not believe that the cost is so much when hens are on ranges, as they need little or no feed in the summer. The prices of all kinds of grain of course regulate the cost of eggs, but in our experience the cost of a dozen eggs at present prices for feed, provided (and that is the main point) the hens are good layers, should not exceed 6 cents. This does not include shelter or labor in caring for the flock. If the hens are indifferent layers and the egg production is small, the cost may reach as much as 15 cents a dozen, but such is an infrequent occurrence. —*Hartford Times*.

APPLES AS MEDICINE.

The apple is such a common fruit very few persons are familiar with its remarkably efficacious medicinal properties. Everybody ought to know that the very best thing they can do is to eat apples just before retiring for the night. Persons uninitiated in the mysteries of the fruit, are liable to throw up their hands in horror at the vision of dyspepsia which such a suggestion may summon up; but no harm can come to even a delicate system by the eating of ripe and juicy apples just before going to bed. The apple is an excellent

brain food because it has more phosphoric acid in easily digested shape than other fruits. It excites the action of the liver, promotes sound and healthy sleep, and thoroughly disinfects the mouth. This is not all. The apple helps the kidney secretions and prevents calculus growths, while it obviates indigestion and is one of the best preventives known of diseases of the throat. Everybody should be familiar with such knowledge.

COLORADO FOR SUGAR BEETS.

Colorado is the one grand place of all others for the successful production of the sugar beet says the *Denver Field and Farm*, and the sooner investment people learn this fact the better it will be for us in securing manufacturing establishments. for many years past, in fact since the early introduction of the sugar beet, it has been noticed that beets cultivated at a certain latitude above sea level, in diluvian soil, are richer and better suited for sugar extraction than the valley or alluvian soils. Experiments of Dr. Hanamam de Lobositz and others, have demonstrated this fact beyond cavil, the argument being that the roots thus have more air, more direct sun's rays, and, furthermore, do not absorb the same percentage of those mineral elements which subsequently become difficult to handle in beet-sugar extraction.

SUGAR PRODUCTION.

The production of beet-sugar in this country in 1896 was only 40,000 tons, but Americans paid for foreign beet-sugar last year \$138,000,000. Europe has 1,440 beet sugar factories, against seven in the United States. Europe produced 4,130,000 tons of beet sugar in 1896, and the world's total production of beet and cane sugar was 6,670,000 tons, of which the United States yielded 315,000 tons (beet-sugar, 40,000 tons.) Though producing of beet and cane sugar only 315,000 tons the United States in 1896 consumed 1,960,080 tons, paying other countries, principally Germany, cash for 1,645,086 tons of sugar.

The average crop of beets is fifteen

tons to the acre, giving a value of \$75, less \$5 for cost of production. A low average of sugar would be 12 per cent to the ton of beets, and this runs above 15 per cent. These figures are gleaned from the experience of the seven American factories—one at Watsonville, Cal.; one at Chino Valley, Cal.; Alvarado, Cal.; Norfolk, Neb.; Grand Island, Neb.; Eddy, N. M., Lehi, Utah; and Chicago Heights. Factories are projected at Rome, N. Y.; Menominee Falls, Wis.; Alamitos, Cal., and at Salinas City, Cal.

EXPERIMENTS WITH COTTON.

The following five varieties of cotton, of the forty-two varieties tested at the Texas Experiment Station, made the largest money value per acre; Texas Oak, \$35.56; Jones Improved, \$34.89; Cochran's Prolific, \$34.88; Welborn's Pet, \$34.42; Dickson's Early Chester, \$33.72. The five varieties that made the largest yield of seed cotton per acre were Dickson's Early Cluster 1346; Peerless, 1223; Cochran's Prolific, 1216; Texas Oak, 1196; Welborn's Pet, 1195 pounds. Full particulars of these and other tests with both cotton and corn, are published in a recent bulletin of Texas Experiment Station. Every farmer should write for a copy, if his name is not already on the station mail list.

EARLY POTATOES.

Early potatoes are the most profitable, and the gain of a few days may make a great difference in the value of a crop. At the Kansas Agricultural College the following experiments were made during the past season. On Feb. 23, four of the common green house seed flats were filled with even sized tubers, placed on end with the "seed end" or apex up, and were filled around with sand, leaving the upper fourth of the tubers exposed. Forty-four tubers filled a flat and one flat each of the varieties, White Ohio, Beauty of Hebron, Early Harvest and Carman No. 1, was prepared. These flats were set under a bench in a cool propagating house where they received

partial light and a temperature of from 50 to 65 degrees. Strong sprouts began to push from the eyes, very different in appearance from those of potatoes sprouting in the dark and in bulk.

On March 22 all of these lots were planted in furrows, the tubers being carefully removed from the sand and planted entire in the same position in which they stood in the flats, and fourteen inches apart in the rows. For comparison a similar parallel row of each sort was planted of whole tubers selected from the potatoes stored in the cellar. As they grew the sprouted potatoes took the lead in strength and vigor of tops from the start, and both lots of whole seed kept ahead of cut seed of the same varieties. On June 1, the sand sprouted lots showed excellent young table potatoes, while none of the others were yet fit for digging and not only were they more than a week earlier but the yield was proportionately greater.

HOT BED MANURE.

Good horse stable manure with not too much straw or litter is the best material for hot bed manure. It should not be burned out or it will develop only a mild heat. In the latter part of February, or earlier according to locality a pile of manure in quantity sufficient to make a bed 18 inches deep under the sash to be used should be hauled to the place needed, forked over evenly, dry portions being thoroughly wet, and built into a compact mound. When fermentation is well under way as indicated by the steaming of the pile, in about a week or ten days, it should be forked into another pile pitching the outer portions of the first toward the center of the second, again wetting all portions that are dry. In about another week it will be in a strong fermentation and ready to build into the final bed.

CULTIVATING ONIONS.

Success with onions is a matter of study and a great deal of hard work, but no crop yields such uniform and large profits. The

new onion culture differs from the old in that the seed is sown under glass in February or March and the plants set in the open ground about the first of May, cutting back the tops and roots too, if they are long, and putting them three inches apart in the rows. The old way is to plant seed in open field about April 1. Rows about 14 inches apart and thinning plants to four inches. A heavy application of barn-yard manure gives better results with onions than the more concentrated fertilizers.

The most important onion disease is the thrips (*Thrips striatus* Ost of the family *Thripidae*). A 10-to-1 solution of the standard mixture of kerosene emulsion is the most efficient remedy, applied as soon as the insect appears.

WINTERING CABBAGES.

A Colorado farmer gives the following method for keeping cabbages in winter. "I plow deep furrows by going two or three times in a furrow with a plow turning fourteen inches wide. I run a furrow to every four rows of cabbage, or to three if the cabbages are thick in the row. I let cabbages lie four or five hours after pulling, then pack closely in the furrows with the heads down. At first they are covered with a light layer of earth by throwing a furrow from each side. At the approach of severe weather I cover with coarse, strawy manure, but not so thickly as to heat. Those to be kept till late in spring keep better if placed on the shady side of rows of trees. We have very little rain in winter, and this plan might not do so well where rains and snows are heavier."

FATTENING CATTLE.

About one million head of cattle have been sent to the country for fattening purposes, from Chicago, Kansas City, Omaha, St. Louis and Denver, so far this year. Last year during a like period only 597,000 cattle were sent out and in 1895 only 552,000. The demand is still brisk.

It takes about three seconds for a message to pass through the entire length of the Atlantic Cables.

FIGS IN CALIFORNIA.

The California State Board of Trade has taken up the matter of developing the fig industry and has enlisted the support of the secretary of the Department of Agriculture. In a recent letter to him they said:

"For the fiscal year ending June 30, 1896, there was imported into the United States 11,900,700 pounds of figs, valued at the port of export at \$639,512, a trifle over 5 cents and 3 mills per pound. This sum does not accurately represent the value of the importation. In October of each year nearly all of these figs are sold in the City of New York; the report on commerce and navigation showing that of the amount named as imported, 9,981,351 pounds were imported into that city. These figs are sold at auction and the prices realized are between 9 and 28 cents per pound. Assuming that the average sum paid was 10 cents per pound, the amount paid to exporters in foreign countries for figs averages about \$1,200,000 a year."

The principal trouble with fig growing in California was the absence of a little wasp (*Blastophaga psenes*) the intervention of which is needed to pollenate the female flowers of the edible fig. Prof. Gustav Eisen has made some interesting experiments which have resulted in the foregoing conclusion and that it is necessary to import some *Smyma* fig trees containing figs with the pupa of the wasp thereon for propagating purposes.

Secretary Wilson has promised to lend all the assistance possible.

MONEY FOR AGRICULTURE DEPARTMENT.

Secretary of Agriculture Wilson will, in his annual report, ask Congress for a material increase in the appropriation to be allotted to him. The money will be employed to facilitate the work of the Bureau

of Animal Industry, the Farmers' Bulletins and the Weather Bureau.* The work of the first-named bureau in sending butter to Europe as an experiment has met with much success, many English firms having sent their representatives to this country to buy up all the available butter for export.

MISSOURI CROPS.

Col. J. B. Rippey of Columbia, Mo., Secretary of State Board of Agriculture, estimates corn crop of 1897, at 167,500,000 against 200,000,000 bushels for 1896. The Northwest section of the state gives the largest yield, an average of 28 bushels per acre. Cotton for 1897 is about the same as last year, the yield being 13,500,000 pounds. Tobacco is yielding about 720 pounds per acre against 668 last year. The potato crop is much smaller, being 3,650,000 bushels against 7,830,000 in 1894. Pastures were never grazed more closely and have suffered for want of rain.

BLINDING CATTLE.

Cattle are going blind in some parts of the Indian Territory, from some kind of an eye disease. Their eyes will run water, turn white, when they go blind and remain in this condition for ten days or two weeks when they come to their sight, but some remain permanently blind. To treat this disease, keep the cattle in a cool dark place and give a pound of Epsom salts every other day for a week.

COWS WEAR BUTTONS.

Everybody else has had a chance at the button fad and now it is the cow's turn. Those of them who are in good health must be decorated with buttons, whether they will or no.

Arrangements have been made by the health authorities of Alameda county, California; to submit the cows in all dairies of the county to the tuberculin test, and those that pass the test successfully will have a small silver button attached to the

ear as a badge showing their healthy condition. Cows that cannot pass the test will be killed.

NEW FRUIT PICKER.

Two Pennsylvanians have patented a fruit picker, consisting of a pole with a steel loop at the top, having the upper edge sharpened and bent inward to cut the fruit from the limb. A loosely woven tube made of cords is attached to the under side of the loop and extends down to the lower end of the pole to break the fall of the fruit.

ITEMS.

The sheep industry is on the boom out west this year.

Colorado is advancing very rapidly in the dairy industry.

The great packing companies are going into the butter and egg business now. Of course there's money in it.

Keep the chickens free from lice. A remedy for a lice-infested hen house is to burn sulphur in it. Put a pound of sulphur on live coals and close the door tightly and leave for an hour or so.

If you want to succeed in the dairy business make good butter and sell it to customers direct. There are always a large number of families willing to pay an extra price for butter from a nice home place.

The smaller stock growers have become so thick on most ranges that they feel their power and are not slow in making it felt. The old-time cattle baron will have to change his tactics if he wants to stay in the business.

During 1896 England imported from Denmark 120,000,000 pounds of butter, 157,000,000 pounds of pork and bacon, and 9,180,000 score eggs. Within two years the production of bacon in Denmark has increased 20 per cent.

Kansas has 552,538 milch cows, an increase of 36,963 during the year. There are 2,399,494 hogs in the state. Poultry

products to the value of \$3,909,892 have been sold, and butter, cheese and milk to the value of \$1,509,381.

Runaway horses are unknown in Russia. No one drives there without having a thin cord with a running noose around the neck of the animal. When an animal bolts the cord is pulled, and the horse stops as soon as it feels the pressure on the windpipe.

February, 1866, was in one way the most wonderful month in the world's history. It had no full moon. January had had two full moons and so had March; but February had none. This remarkable state of things had never happened before since the creation.

There is nothing like the dairy farm the year round to insure a steady income, and winter dairying is a sure road to prosperity and comfort for the dairy farmer. With Elgin at 22 cents a pound and a higher price for better brands, the coming winter's outlook is good.

English dairy authorities state that the English cows produce 1,400,000,000 gallons of milk annually, of which 400,000,000 are used for making butter and cheese, 600,000,000 as milk for the table, at an average of sixteen gallons per inhabitant, and 400,000,000 in fattening calves.

In haste she tried to drive a nail,
 But the next time she will linger;
 And then perhaps she'll miss the one
 That's growing on her finger.
 In this world of sin and woe,
 Man should have but few regrets
 If he wants little here below,
 For that is all he gets.
 O the musing poet warbles
 Of the frost that's on the vine
 And the labors of the huskers,
 In a style that's very fine;
 But you bet he couldn't do it
 If he'd ever husked an ear,
 For about that much of farming
 Makes the romance disappear.

MAXIMS FOR THE IRRIGATED FARM.

Some Bostonians don't know beans.

The poultryman's main guy—the bone cutter.

A fool and his father's money are soon parted.

The devil's hardest blows are aimed at the home.

A tree will not bear fruit if it is not fed regularly.

The good housewife will never beat a carpet when its down.

The hog may be a squealer but he never gives anything away.

The best way of spending your money is the most economical.

Oyster dealers are not arrested for working the old shell game.

It isn't always modesty that keeps people from telling the naked truth.

When domestic troubles are little ones married people ought to be happy.

Domestic economy doesn't mean stop the kitchen clock at night to save time.

If the crow has a creed it is that all birds are heretics that do not wear black.

Always give your wife her own way; it will save her the trouble of taking it.

No poetry would be written if birds had to keep still and let frogs do all the singing.

The hatter and the shoemaker may not be divinities but they shape the ends of men.

Bad temper in the milkman has a demoralizing effect on the temper of the cow.

An irrigated farm free from incumbrance is better than stock in a Klondike gold mine.

The reason it changes so often is because

there's a woman instead of a "man in the moon."

You might get along faster if you didn't lose so much time telling people how smart you are.

The man who sits down to wait for a golden opportunity to come along never has a comfortable seat.

The politicians are always willing to furnish the bung-hole for the candidate to build his "barrel" around.

The people who talk without thinking and those who think without talking always make each other tired.

What this country needs is a protective tariff that will enable us to raise titled young men for our heiresses.

The girl in love who has a rival should keep an eye on her—and if the rival is a widow keep both eyes on her.

The desire of some men to wobble around in a big place rather than fill a small one accounts for many of life's failures.

If your son is disposed to be a farmer send him to an agricultural college and let him start under favorable auspices.

It is impossible to discourage the man who has learned in whatsoever condition he finds himself therewith to be content.

A lawyer who would commence to practice without first studying the books of his profession would cut but a sorry figure. The farmer who attempts to farm without informing himself of what others have done and are doing in his business is at a similar disadvantage.

THE CIRCUS CLOWN.

The man who married a Boston woman last Thursday need not have gone to the trouble of having the ceremony in a cage

of lions at the zoological museum to prove that he was utterly terrorless.

The strife was long and bitter.

You couldn't call it less,
And still they claim the football game

Was hardly a success;
For though some men on either side
Are maimed for life, 'tis said,
And several lost an eye beside,
Not one was sent home dead.

"Who is that man talking so loudly?"

"Oh, that's Nugget, the Klondike hero.
Had remarkable luck."

"Ah, got rich?"

"No, got home."—New York Journal.

Teacher—So you've forgotten already
what I told you yesterday. What's the
use of your head, Johnny Miggs?"

Johnny Miggs—Please, sir, to keep my
collar on."—Pick-Me-Up.

He—"Ah, now! if I were only to think
twice whenever I spoke, I should be——"

She—"You would be what they call a
mute."—Aily Sloper.

"There are six necessities, you know,
for a happy marriage."

"What are they?"

"First; a good husband."

"And the others?"

"The other five are money."—La Carica-
ture.

"To be good," remarked the offhand phi-
losopher, "is to be beautiful."

"Wal," replied the man who was trying
to sell him a mountain farm. "I dunno.
Mebbe it's the exception as proves the
rule."

"What do you mean?"

"I was thinkin' 'bout a 'possum. There's
no denyin' that 'possum's mighty good; but
you cant never make me think it's purty."
—Washington Star.

Boarder—"This chicken soup seems to
be rather weak."

Landlady—"I don't see why; I told the
cook how to make it, but perhaps she didn't
catch the idea."

Boarder—Perhaps she didn't catch the
chicken."

"How statuesque your daughter is, Mr.
Scadds!"

"Statuesque? Why I have seen that girl
sit for hours at a time, not moving a finger,
while her mother worked."

Editor (to subordinate)—"Now, what are
we to do with these sketches of Russian
prisoners being taken to Siberia?"

Subordinate—"Mightn't we call them
'Miners on the way to Klondike?'"

Editor—"Excellent idea! Just knock
out the Cossacks and fill in with snow-
drifts."—London Punch.

"Been anybody in?" asked the grocer.

"Mr. Brown was in and left his meas-
ure," said the new boy.

"Left his measure? Does he take this
for a tailor shop?"

"Naw. He left a gallon measure to be
filled with molasses."—Indianapolis Jour-
nal.

He—"Do you believe there is much in a
name?"

She—"Yes; some names. For instance,
the Russian Count has nearly the whole
alphabet in his."

"I suppose," said Meandering Mike, who
had been talking of the times when he en-
joyed affluence, "that you're goin' to tell
me about how I order of put something by
fur a rainy day?"

"That is precisely what was in my mind."

"Well it wouldn't of done no good.
What ruined my prospects was a drought."
—Washington Star.

"Don' go by fust impressions," said
Uncle Eben. "Whah'd folks be now ef
de man dat diskivered de oystuh hadn'
stopped ter pro open de shell?—Washing-
ton Star.

"I want a pair of gloves for my hus-
band."

"Do you know what size?"

"Oh, no!—but—er—er—I know he wears
big boots."

A little fellow who saw a steamboat for
the first time exclaimed: "Look, mam-
ma! There is a railway engine taking a
bath."

PULSE OF THE IRRIGATION INDUSTRY.

A BIG FAILURE.

A special telegram to the Chicago Tribune dated Phoenix, Nov. 16, says: The Arizona Improvement company, controlling the largest irrigation system in the Southwest, will pass tomorrow into the hands of a receiver. With it will go the Arizona Canal, forty miles in length, with over 100 miles of lateral ditches, 25,000 acres of fruit land, and 52 per cent of the stock of the Grand, Maricopa, and Salt River Valley Canals. The water power canal, generating 5,000 horse-power, is also included.

Two suits in foreclosure were filed this afternoon by the Merchants' Loan and Trust company of Chicago for the bondholders in the system, who in turn have appointed a Reorganization committee, consisting of Charles H. Fairchilds, President of the New York Security and Trust company, New York; W. H. Burroughs, banker, of Middletown, Conn.; Morgan T. Bulkley, President of the Aetna Life Insurance company of Hartford, Conn.; A. B. Leach, banker, New York; Andrew Crawford, attorney, Chicago. The greater number of the bonds have been deposited in New York with this committee. The bonded and floating debts involved are: Arizona Improvement company, \$1,234,000; Arizona Canal, \$526,000. Interest on the debt was promptly paid till last January, when the first default was made.

The Reorganization committee is willing that for a receiver there be appointed W. J. Murphy, president of the companies. This is to be opposed by the sponsors of the third suit filed almost simultaneously by Illinois holders of land in the vicinity of Glendale and Peoria settlements, irrigated from the Arizona Canal, who also pray for a receiver. The trust company

suits were instituted at the request of the canal management, who can no longer see their way clear to the payment of the immense interest charges in the present condition of their property. The canal must be enlarged, and to secure the best results water storage is essential yet impossible, without large financial assistance.

The collapse was immediately caused by the necessity for a new dam, carried away by floods, necessitating an expenditure of \$250,000. Large sums have also been expended in the development of the citrus and general fruit growing industries, and in securing colonists for the companies' lands, and in the acquirement of water rights in the lower lying and older canals, whereby control was secured of the water supply of the entire northern half of the Salt River Valley, aggregating an area of several hundred thousand acres, watered by 265 miles of main canals and laterals.

Orson Smith, President of the Merchants' Loan and Trust company, said last night: "Our bank is simply trustee for the bondholders, who are chiefly residents of Scotland. The Arizona company is an irrigation enterprise, and has been in business for many years. Lately it defaulted on interest payment on the bonds, a failure due no doubt to unsatisfactory business, and hence the action of the bank as trustee."

WYOMING ELECTION CASE.

The case of Henry Rasmussen vs. Fred M. Baker, opposing candidates for county treasurer of Carbon County, Wyoming, has been decided by the Supreme court in favor of the plaintiff. Baker was given a certificate of election, being credited with 1189 votes and Rasmussen with 1162. The case rested upon the fact that 104 Finland-

ers voted for Baker and that these men could not read the constitution in the English language but could read a translation of it in Finnish. The question at issue, which has been passed to the Supreme court by the District court, was whether the constitutional provision that "no person shall have the right to vote who shall not be able to read the constitution of this state", required an ability to read it in English.

The Supreme Court has had the matter under advisement since August 2nd and has given it a most thorough investigation. In the opinion rendered by Justice C. N. Potter, in which Chief Justice Conaway and Justice Samuel T. Cain concurred, it is held that the meaning of the phrase, "The Constitution of the State," must be determined from a consideration of its relation to the language in which the constitution was written and adopted by the people of the state, and finally published. The English language is the language of the country in general and in common use and in that language the constitution was written. A translation would be only a reproduction of the principles of the constitution and not a copy of the instrument itself. It has been held in New Jersey and Louisiana that a translation of a law is not the law nor a copy of it. A statute is only endowed with authority in the language and words in which it is passed: The courts would not be authorized to resort to a translation for the purpose of construing or enforcing a law and it must be held that when the people used the term, "the constitution of the state" they meant the particular instrument which they had adopted as such constitution and that instrument was in the English language.

The court therefore holds that no person is entitled to vote who cannot read the constitution in the English language, unless he was a voter at the time of the adoption of the constitution or is physically unable to comply with constitutional requirements.

The decision unseats a number of county officials who were elected by such vote and gives their places to democrats.

AN IMPORTANT LAW SUIT.

The case of the Crawford Irrigation Company against Leroy Hall and others has been referred by Judge M. P. Kinkead, to the Nebraska State Board of Irrigation. The court dissolved the temporary injunction granted the Crawford Company and denied the application for a permanent injunction by Leroy Hall. The case is one of the most important ever brought in Northwestern Nebraska.

This case was brought about two years ago by the Crawford company for the purpose of testing its right to the use of the waters in White river. Since that time the Crawford company has made vast improvements by building over twenty-five miles of ditches and several large storage reservoirs. It is said the company has expended already nearly \$50,000 in making these improvements. There are about thirty or forty defendants, nearly all owners of property adjacent to the river below the point where the company is alleged to have diverted the waters of the stream. The principal defendant is Leroy Hall of Crawford, who contests the right of the Crawford company to the use of the water by reason of a prior right, which he claims by right of prescription.

Aside from the thousands of dollars of property rights involved in this case, it is important by reason of the constitutional questions which will necessarily be determined. Much interest is manifested throughout this district. Judge Hamer of Kearney is chief counsel for the Crawford company and with him are associated County Attorney Allen G. Fisher and local Crawford attorneys. Hon. Samuel Maxwell of Fremont, assisted by Judge A. W. Crites of Chadron, represents the principal defendants.

The Crawford company will appeal to the Supreme Court on the ground that the

State Board of Irrigation is not vested with judicial powers.

OPPOSING FEDERAL CONSTRUCTION.

That man Brigham, the monkey of the agricultural department, was beautifully snowed under at the irrigation congress last week when he had the gall to submit the following minority resolution as he had been commanded to do by his masters at Washington: "Believing that the construction of storage reservoirs for irrigation purposes is not a proper function of the federal government, but its work should be confined to surveys of investigation for the collection of information in regard to water supply, extent of irrigable lands, location of reservoir sites, etc., the minority of the committee on resolutions recommend that the favoring of construction by the federal government of reservoirs be not adopted."—*Denver Field and Farm*.

A COLONY IN TROUBLE.

The Farm Field and Fireside colonies in Southern California are involved in all kinds of litigation. According to the reports in the general land office the title to part of the property was cancelled by the Land Commissioner March 15, 1897. The Los Angeles Express says that the Federal grand jury has returned indictments against James W. Wilson and A. T. Howard on the charge of illegal use of the mails in connection with the Columbia Colonization scheme.

AWAKENING IN THE EAST.

If some of the money that is expended under the river and harbor appropriation was used to construct irrigation canals from the head waters of the Missouri river to the territory where irrigation is needed, it would lessen very materially the danger to life and property from floods on that river and would open up good farming lands for thousands of homes for the people.—*Holyoke Herald*.

THE TIMBER QUESTION.

The timber question continues to be a cause of disagreement.

The almost criminal ignorance of the west on the part of government officials, says the *Western Mining World*, was illustrated by the recent attitude of Commissioner Hermann relative to the use of timber for mining purposes. Senator Carter recently corrected some of Hermann's views as follows: "Commissioner Hermann would modify his criticisms materially if enlightened by a personal visit to and inspection of the region from which the mining companies in Montana secure the timber for their mines. He evidently has in mind the quantity of timber on 160 acres of land in Oregon when he suggests that area sufficient to furnish a year's supply of timber for Montana copper mine. There is scarcely a quarter section of land in the Bitter Root valley capable of furnishing saw timber enough to supply the necessities of the Anaconda mine for thirty days. The sale of timber may, and doubtless will prove more satisfactory than the permit system, and I doubt not, the mining and other industrial companies would much prefer actual purchase at reasonable stumpage rates. But it must be borne in mind that they have hitherto been denied the privilege of purchase and have been forced to rely on the permit system. There has been no exportation of lumber from the public lands of Montana to any other state, and I think the people are entitled to the use of the timber growing in the country to aid in its development. It rests with congress to say whether they shall be permitted to cut or allowed to purchase it. Our Montana people will adjust themselves to either proposition."

A LITTLE MINING NEWS.

The daily production of copper in the United States is 1,500,000 pounds.

The total value of iron and steel exports for 1894 was \$29,943,729; in 1895 it

is \$ 35,071,563 and in 1896, \$48,670,218. The English newspapers are predicting serious inroads into British trade by the Americans.

The annual production of manganese iron ore is about 170,000 tons. The ore of Wisconsin and Michigan assays an average of ten per cent.; New Jersey about twelve per cent. and Colorado about twenty-seven per cent.

Gold to the amount of over \$44,000,000 has been imported into the United States thus far this year, as against some \$79,000,000 exported in 1896. This is merely a straw which indicates the direction of the prevailing business currents.

The Michael Davitt claim, covering an area of five acres (400x900 feet) was recently sold for \$601,000. It was at a sheriff's sale and was purchased by Frank Klepetko, general manager for the Boston and Montana Company of Butte, Mont.

The Risdon Iron Works, of San Francisco, have a patented gold dredge at work in the old hydraulic washings in the Yuba river. The dredge has a working capacity of 2000 cubic yards per day and the cost of operating is less than three cents a yard.

STATE NEWS.

ARIZONA.

Phoenix, Arizona, will soon have a new theatre building.

The cattle business in Arizona is on the boom.

Experiments with the growing of cotton are being made in Arizona and promise to be successful.

MONTANA.

W. B. Jordan, President of the First National Bank, of Miles City, who recently purchased a large tract of agricultural land in the Shields River Valley, is arranging to construct an irrigation canal with a capacity of 2,000 inches of water. The ditch will extend down the valley five miles and will reclaim a valuable tract of

agricultural land. A preliminary survey for the new canal has already been made.

WYOMING.

Work on the construction of three large canals to irrigate the lands of the Indians taken in severalty on the Shoshone reservation has commenced. The most important canal is taken from Big Wind river, near St. Stephen's mission. It will be five miles long, six feet wide and eighteen inches deep, and will irrigate several thousand acres of fine land. All of the work upon the canals, excepting the surveying, is being done by the Indians.

NEW MEXICO.

The outlook for sheep and the wool clip in New Mexico was never so bright as at present. The ranges are in excellent condition. Purchasers of sheep have been very heavy.

The office of the United States paymaster for the Southwestern district has been moved from Albuquerque to Denver, Col.

The Pecos Valley people are still looking forward to the time when the new railroad will be opened between Roswell and Amarilla, Texas.

SOUTH DAKOTA

A great many inquiries are coming in from the east to the real estate men in regard to Black Hills property of various kinds. There is considerable inquiry for farm land, especially that which can be irrigated. The problem of farming successfully in the Hills has been solved. There is a system of mountain stream flowing down the valleys which can be easily tapped and made to moisten vast areas of the richest kind of land.

Marcus P. Beebe, President of the Bank of Ipswich, states that there is a good demand for property in the northern part of South Dakota, and that the cattle business is better than it has been for a long time.

The Fort Randall Military Reservation, containing about 100,000 acres of land was recently thrown open to settlement under

the homestead law and already hundreds of settlers have filed on claims. A portion of the reservation is in South Dakota and the remainder in Nebraska.

KANSAS.

The Kansas State Horticultural Society will hold its annual session in Senate Chamber in the Capitol building, Topeka, Dec. 28, 29, 30. In the call for the meeting a strong plea is made for the development of this most important industry. A very interesting program has been arranged and every subject of interest to fruit growers and gardeners has been covered.

The people of Kansas have some \$10,000,000 more of money on deposit in the banks this year than they had at the same time last year. There is a pretty good prospect that at the next election Kansas will roll up something like her old-time Republican majority.

UTAH.

The lawsuit between the Richfield Irrigation Co. and the Annabella Irrigation Co. et. al., there being nine corporations parties to the suit, has been terminated peacefully by compromise. The dispute was over the amount of water each company was to take from the Sevier river in Sevier county. Some of the leaders of the Mormon Church interested themselves in the case and the result of their efforts is that the water is to be divided as follows: The Richfield Irrigation Company is allowed 35½ per cent of the Sevier river water when there is as much as 101 feet of water above the dams, the highest dam being at Joseph City, and under the same conditions other companies are apportioned the following percentages: Monroe Irrigation company, 19; Brooklyn Irrigation company, 11½; Joseph Canal company, 10; Annabella Irrigation company, 8½; Elsinore Irrigation company, 7; Wells Irrigation company, 4½; Nielson ditch, 2; Isaacs ditch, 1½; Higgins ditch, ½. The Vermillion Irrigation company gets all the waters rising between the Nielson

and the Vermillion dams, and all the seepage water from the Richfield meadows north of the Vermillion dam.

IDAHO.

Work on the irrigation system to water the lands on the Indian Reservation at Blackfoot is progressing. A dam 20 feet high and 80 feet wide has been built about three miles above Blackfoot and the main canal will be sixteen miles long. The amount of water available is about 300 cubic feet per second and will water about 20,000 to 25,000 acres of land. The work so far has been done by the Idaho Canal Co., which secured the contract from the government. Engineer G. H. Nickerson, in charge. The laterals are to be built by the Indians themselves under the direction of a government engineering corps.

When the land now occupied by the townsite of Pocatello was purchased from the Bannock Indians the money was held in trust by the government. It amounted in round numbers to \$200,000. This money is now being used to provide water for the Indians to use upon their farm lands. This past year they have irrigated about 1,000 acres, the water being turned from the river by a temporary dam. About twenty Indians are now at work getting laterals ready for next season.

State Engineer Fred J. Mills recently inspected the works.

COLORADO.

James A. Lockhart of the Alfalfa Land and Cattle company, has purchased the remaining cattle belonging to the old Colorado Springs live stock company, paying about \$40,000. The cattle will be driven to the feeding ranches of the Alfalfa company, near Fowler, Otero county.

Another railroad from Denver to Salt Lake City is proposed. The route suggested is from Denver northwest through the northern part of Colorado and thence west into Salt Lake City. It is said the Burlington is backing the enterprise.

Austin G. Gorham of Denver, has gone to New York in the interest of his coal properties at Marshall and also to confer with some Eastern capitalists regarding a new Colorado railroad.

Colorado has about 100,000 acres in fruit trees.

The available coal supply in the state according to United States geographical report is 45,197,100,000 tons.

The average yield per acre of Colorado farm lands is as follows: Wheat, 25 bushels; oats, 40 bushels; corn, 40 bushels; potatoes, 250 bushels.

Value of agricultural products in 1896 was \$28,685,000.

CALIFORNIA.

The supervisors of Ventura County this year have laid along the high roads 55,000 feet of 4 and 6-inch pipe, with standing pipes at convenient intervals, for filling water tanks, and will have the entire avenue from Ventura to Nordhoff, eighteen miles in length, regularly sprinkled next year. They have also let a contract for an iron bridge over the Santa Clara River, 1,000 feet long, to cost over \$25,000.

The creameries around Westminster are doing a big business. One creamery uses about 5,500 pounds of milk daily; another one uses 7,000 pounds. The farmers get about \$1 per hundred pounds. The amount of money distributed annually among the farmers by these two creameries is about \$45,000.

The Colton, Cal. cannery's output this season was 2,400 cases apricots; 22,785 peaches and fifty tons dried fruit. The season began July 1 and continued about three months.

The Sunset Irrigation District has been dissolved by Judge Webb of the Superior Court.

All the canneries and packing houses in Southern California have been running on full time this year and the pack is larger than ever before, while most of the product has already been sold at a good profit. The Whittier cannery hauled

over three hundred tons of fruit from the San Gabriel Valley, around Azusa, and also brought in fruit from the San Fernando Valley. The pay roll of the Whittier cannery has exceeded \$6,000 a month this year, while several times that amount has been paid out for fruit.

Fresh fish are being shipped east in large quantities from San Diego.

The Southern Pacific railroad is to build large tanks for storing petroleum for use in locomotives; at Indio a tank with a capacity of 50,000 gallons: Crafton, 12,000; San Bernardino, 12,000; Yuma, 50,000; Summerland, 30,000; at Los Angeles there is a tank with a capacity of 200,000 gallons.

It is estimated that 600 tons of tissue paper will be required to wrap the 12,000 carloads of oranges that are expected to be shipped this year. The Western Paper Bag Co. has already sold 300,000,000 wrappers. The paper comes from Kaukauna, Wis.

The lima bean is one of the important crops of Santa Barbara and Ventura counties.

Five hundred tons of green fruit have been handled by the Duarte-Monrovia Deciduous Fruit Association of California this season. The fruit was dried.

The Oxnards are figuring on the erection of a beet sugar factory in Ventura County, Cal., with a capacity of 2,000 tons of beets per day and costing \$2,000,000.

There are now five creameries in San Diego county. One at Escondido, one at San Luis Rey and three at San Pasqual.

Ontario expects to have a fruit packing house soon.

The Santa Fe railroad is building its own locomotives in the shops at San Bernardino.

Tobacco is being successfully grown in Southern California.

East Los Angeles is to have a new brewery. The foundation is being laid.

"Tell me, my good friend, did you ever take a bath?"

"No! What, 'ave you lost one?"

WITH OUR EXCHANGES.

REVIEW OF REVIEWS.

In addition to the customary review of the leading articles and periodicals of the month, the Review of Reviews for November contains a lengthy article by Carl Snyder, entitled "From the Lakes to the Sea", in which, under various heads and subdivisions, he gives "an account of the devices and inventions that have now rendered feasible a great ship canal." "The Situation in Spain," is discussed by Stephen Bonsal. A character sketch of the late Henry George, by Arthur McEwen, gives a good idea of the personal characteristics of that famous reformer, who is described by one near to him as "the justest, the most considerate, the sweetest, and most lovable of men"—certainly an enviable description. The Greater New York campaign is given in caricatures from leading papers. Deserved credit is given to two women, Mrs. Kinnicutt, of New York, and Mrs. A. E. Paul, of Chicago, for being the pioneers in the street-cleaning movements in these two cities. The former inaugurated the movement in New York, while in Chicago Mrs. Paul has been most active in getting the streets and alleys of the north side in a more cleanly state. She passed the civil service examination as an applicant for the position of ward inspector of street cleaning and is now on duty with her force of men. Among the late books reviewed is "Alfred, Lord Tennyson: A Memoir" by his son, Hallam, Lord Tennyson. In the numerous extracts given one can gain an idea of what an interesting volume this will be to the admirers of the poet, giving as it does a clear insight into his character and doing away with many erroneous impressions many had of his personality.

THE CENTURY.

In the November issue James Whitcomb

Riley gives the first part of his serial poem, "Rubaiyat of Doc Sifers" and the serial story, "Good Americans," by Mrs. Burton Harrison is also begun in that number. William H. Ballou contributes an interesting article on "Strange Creatures of the Past," with a number of illustrations by Charles R. Knight. Under the title of "An Imperial Dream," Sara Y. Stevenson gives reminiscences of Mexico during the French intervention, giving us pen-pictures of the personages of history. One of the most interesting articles in the entire magazine is the one by Hon. A. W. Terrell, late United States Minister at Constantinople, giving as it does an interview with the Sultan of Turkey, in which we get the Turk's side of the Armenian question. Mr. Terrell received a cordial reception from the Sultan, Abdul Hamid, who is described as "most courtly and refined in entertaining his guests." The Sultan requested that the interview be made public to the people of the United States, and in pursuance of this request Mr. Terrell wrote the article that appears in the Century. Regarding the Armenian troubles the Sultan affirms that it was not on account of their christian religion that the trouble with Armenia arose, but that, on the contrary, their religion had always been respected and they had held many positions of trust in the Ottoman Empire until it was found they were plotting to destroy it, when the trouble between the two nations arose. He stated that Christian nations, in their sympathy for the Armenians, forget that in 1827 during the Greek revolution 27,000 defenseless Turkish men, women and children were brutally murdered in one city after its surrender. Edward Girey, one of the foremost Scandinavian composers contributed an article on Mozart,

THE FORUM.

The November Forum is so full of good things it is hard to decide which merits the most notice. To those interested in political questions the article by Hon. John G. Carlisle, ex-Secretary of the Treasury, on "Dangerous Defects of our Electoral System," the first part of which is given, will be appreciated. Under the heading "The Mississippi River Problem" Robert Stewart Taylor upholds the levee system as the one protection against destructive overflows from the river, while Gustave Dyes is in favor of using dredges to lower the river bed, in preference to building levees. Edwin F. Atkins in writing of "Our Proposed New Sugar Industry" advances some practical ideas that farmers would do well to heed. The second part of Justin S. Morrill's article, "Notable Letters from my Political Friends" appears in this issue. As the letters given were written from 1855-65, at the time when slavery was the question of vital importance, and by such noted politicians as James G. Blaine, Charles Sumner, Horace Greeley, J. Collamer and others, they cannot fail to be of reminiscent interest. A fac simile of a short letter from Thaddeus Stevens is given and for illegibility his writing rivals that of Horace Greeley. The titles of other articles are England and the Famine in India and Letters to Living Authors.

SCRIBNER.

The Christmas number is unusually attractive, with a number of fine illustrations, some in colors. The leading story is entitled "A Christmas Loss" and is a tale of Christmas day, fifteen hundred years ago. "The Posing of Vivette," by J. Russell Taylor, is a little bit beyond ordinary readers. "The Martyrdom of Fame," and "A Guilty Conscience" are good short stories, and the article on "Sir

Edward J. Poynter, P. R. A." by Cosmo Monkhouse, with illustrations will interest those connected with art. A youthful portrait of Louis Stevenson is given, with a poem by James Whitcomb Riley.

MCCLURES.

McClures for December gives us the beginning of another Zenda story by Anthony Hope, called "Rupert of Hentzau." Rudyard Kipling contributes "The Tomb of His Ancestors" in true Kipling vein. W. T. Stead's "Hymns That Have Helped," giving examples of hymns that have spurred men on to deeds of heroism and valor, is interesting reading. "In Unexplored Asia" by R. H. Sherard, is an account of the adventures of Dr. Sven Hedin. "The Incident of the British Ambassador," by Bliss Perry, a story by Robert Barr and a continuation of "Chas. A. Dana's Reminiscences" make up the remainder of the number.

THE GENTLEMAN FARMER.

We must give a word of praise to The Gentleman Farmer for it certainly is deserving of it, being one of the neatest gotten up magazines. The leading article in the November issue is by William Stowe Devol, director Arizona Experiment station; and is in regard to Canaigre. The New Congressional Library has an article devoted to it and is carefully illustrated. The customary Thanksgiving story is contributed by Virginia Hunter, and is called "Silas Blanchard's Thanksgiving."

Space forbids mention of numerous other periodicals.

The reason why weeds grow faster than the corn is explained by a wise old gardener. The weeds are the natural children of the soil, while the vegetables are only step-children.

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THE IRRIGATION AGE.

VOL. XII.

CHICAGO, JANUARY, 1898.

NO. 4.

THE PROGRESS OF WESTERN AMERICA.

OUR NEW ADDRESS **Owing to the fact that much of the Irrigation Age mail goes to the office of the former management, thus causing an inconvenient delay, all communications to the Journal should be addressed to J. E. Forrest, Publisher of Age, 916 W. Harrison Street, as in this way only will they receive prompt attention.**

Good-bye Old Year The year 1897 with all of its "good days, its bad days," lies behind us; one more rosary-bead has slipped through Time's fingers and as the royalists cried "The king is dead, long live the king" so do we say—"the old year is gone—A Happy New Year." The infant hand of 1898 has a firm grip on the scepter, but ere we forget entirely the monarch of 1897, let us glance over our shoulder and see what kind of a reign it was. Despite the pessimist's lament, 1897 wasn't half such a bad fellow. He was born in poverty and so had a hard struggle from the start, for "hard times" had been the cry for two years preceding New Year's day of 1897. What an eventful life he lived in one short twelve-month! He sung "God save the Queen" at Victoria's golden jubilee, he dropped his tears at the grave of many a noted man, who passed to his last sleep after years of usefulness; poets, philosophers, statesmen, many of them stepped out of the race in 1897. He saw a new president take his seat in the chief executive's chair, he saw the miners start for the newly discovered gold fields of Alaska, and saw the revival of California's "golden

days." He has looked with sorrow upon the bloody scenes in Cuba, his heart has ached at the cries of hunger that have come from India and Ireland, and he has rejoiced with us in our prosperity. For Nature gave to us with generous hand, and the past year has been one of renewed prosperity. Despite the long drouth of last summer, the corn crop was unusually large and we exported more corn the past year, as well as rye, oats and provisions, than we have in the last six years. The export of wheat was also the largest it has been since 1891 and owing to the famines in other countries and the comparative shortness of the crops, it brought an extremely high price—so high as to be far beyond the expectations of the most sanguine. The hay crop was rather short, as was also the fruit yield, particularly in the East, apples, cherries, and peaches being somewhat scarce, but the Pacific coast had a good fruit year. Small fruits were very plentiful, with the exception of cranberries; the vegetable supply was not quite as large as the preceding year and prices were therefore higher. This is particularly true of potatoes. Owing to the blight the potato crop was poor, and as in Ireland they had almost no crop at all from the same disease, potatoes are now bringing from 50 to 75 cents per bushel, when last year they brought from 10 to 25.

The record in hogs was second only to that of 1891, which was a record-breaker

Cattle sold for higher prices, horses were in greater demand and of more value, and sheep-raising was also more extensive.

Owing to the yellow fever the Southern trade was interfered with quite a great deal, but to the western farmer the past year has been a god-send and he is paying off mortgages rapidly.

When the farmer has a prosperous year the entire nation is correspondingly prosperous; and this year was no exception to the rule. Wholesale dealers in almost every line report an increase in trade amounting in some branches to 50 per cent. Mining has received a new impetus, as has also building and manufacturing.

In fact old 1897 is a self-made man, who, born in poverty, has successfully raised himself to affluence, and young 1898, like many another son, steps into "dad's shoes". He has begun "where the old man left off," and inherits the results of his father's struggles. He casts aside the patched garments of his sire, and arrays himself as befits one who reigns in an era of prosperity. But the youth will have work on his hands, and it will require a strong nerve and cool head to carry him through the vexations of his career. There will be no presidential election with its attendant noise and conflict, Greater New York is now a settled fact and is therefore off his mind, but the Hawaiian problem still confronts him, the Cuban question is yet unsettled, the "currency plan" is not fully matured, and young 1898 will learn during the coming year the truth of the old adage "Uneasy lies the head that wears a crown." But we will not discourage the youth with gloomy prophesies, but will instead bid him a hearty welcome.

Distress in Alaska.

The history of any great gold discovery is always accompanied by an account of the privation and suffering endured by those who went in search of the precious metal. It is astonishing to think how men will voluntarily face dangers of all kinds for the mere hope—not certainty—of finding gold. The "gold

fever" has caused the death of thousands; they have starved in the desert, been killed by the savages, perished for want of water, died from heat, and now in the Alaskan gold fields, freeze or starve to death, and all for gold. Reports from Alaska are alarming. Recently, it is said, 10,000 men left Dawson city for the coast, and at least three-fourths of this number will die of cold or hunger before they can reach the coast. Realizing this great suffering, a conference committee of congress has agreed upon a measure to appropriate \$200,000 for the relief of the destitute miners. The government will purchase the supplies and the great drawback is how to get these supplies into the interior of Alaska, where the need of them is the greatest. Our government is ever ready to respond to the cries of the distressed and apropos of this is the following editorial from the Mosca (Colo.) *Herald*, which we think is so full of truth and so worthy of endorsement, that we quote it verbatim:

Whatever charge may be made against the United States for not protecting the lives and property of its citizens in foreign lands, it cannot be denied that there is no nation in the world so ready to respond to the appeals of destitution and distress as the American. She may ignore the appeals of the oppressed but when they cry for bread the response is prompt and liberal. This is very different from the course of John Bull who is ever on the alert to protect the lives and property, especially the property, of his loyal subjects so long as it may be accomplished by military pomp and parade but hesitates long or remains indifferent when his pocket-book is threatened. As a case in point it may be noted, that it is doubtful if the Canadian government will rescind the duties on the supplies to be sent to the miners of the Yukon."

The Point Decided.

A case was recently decided by the Supreme Court of Idaho as to the ownership of a ditch. The ditch was constructed originally for mining pur-

poses, by the predecessor of the plaintiff. The land, over which the ditch passed, was afterwards taken up by the defendants and the ditch was not used for some years. The plaintiff then attempted to use it, but the defendants refused to allow this on the ground that it had been abandoned. The plaintiff appealed to the law and the Supreme Court decided that the plaintiff had the right to use the ditch. Couched in legal language the court's decision was as follows, and will be an interesting precedent:

The plaintiff acquired an easement in the lands of the defendant, not by adverse uses, or by prescription, but by grant. Section 2339, Revised Statutes, United States, vested in the predecessors of plaintiff the right of way for the ditch in question when they accepted the offer of donation therein made by the Government in said section constructing the said ditch.

"Section 2340, Revised Statutes, United States, which was in force at the time the defendant acquired his said patent, made the patent of defendant subject to plaintiff's right of way for said ditch, and it is immaterial whether the said patent reserved this right to the plaintiff or not"

**Keep
them
Out.**

As a result of the recent trouble between the game wardens and the Indians at Lily Park, Colorado, the Indians will probably be prohibited from ever returning to Colorado. The Investigating Commission whose duty it was to look into the affair, decided that the game wardens were quite justified in shooting the Indians, as it was in self-defense. The cause of the trouble was as follows: In the fall the Indians were warned not to violate the Colorado game law, regarding the hunting of deer. No passes were to be given for hunting in the state. One savage, however, obtained a pass for himself and companion to hunt horses in Brown's park, which is about thirty miles from Lily Park. The next news the game wardens received concerning them was to the effect that about forty Indians were camped at

the latter place hunting deer. The game wardens, with a party of friends, started for the camp with the intention of arguing the matter peaceably with the chiefs. After spending nearly four hours in talk, the game warden made an attempt to have the chief return with him, when a general fight ensued, the squaws taking a prominent part. Two Indians were killed and several wounded and some of the whites were badly hurt. The wardens were exonerated as the savages were the first to begin the attack. In order to protect the settlers and assure them of safety it is thought best to prevent the Indians returning into the state.

International Dam President McKinley favors an international dam as a remedy for the disastrous overflows of the Bravo river, which are so destructive to the lives and property of the dwellers on the boundary between Mexico and the United States. In his message to Congress he spoke concerning this question as follows:

"The frontier towns, for 113 kilometers down the river from Ciudad Juarez, have sustained losses amounting to many millions of dollars, as well as considerable depopulation by reason of the frequent overflows of the Bravo river and the utilization of its waters for irrigation purposes in American territory, which has materially curtailed its ordinary supply of water. In order as far as possible, to remedy this evil, it has been suggested to erect a great international dam, and negotiations to that end were opened by our minister at Washington. It is to be hoped that the government of the United States, overcoming difficulties placed in its way by speculators in that country, will be willing to conclude a treaty with Mexico for the execution of that work, which is of vital importance to the riparian population on both sides of the river."

In this issue we have an article on this subject by a resident of El Paso, Texas in which the merits of the international dam are fully explained.

THE PROPOSED INTERNATIONAL DAM.

AN INTERESTING SKETCH OF THE ADVANTAGES DERIVED BY FRIENDLY RELATIONS WITH MEXICO.

DURING the past few years a great deal has been written and said about our neighboring republic, Mexico, and of the increasing friendly relations existing between that country and the United States. Perhaps this may be more noticeable to one who has been living here at the frontier for years, at a gateway between the two republics, but the commerce of the United States is now beginning to realize the meaning of these friendly relations; and if the readers of the AGE could just spend a few days at the different ports of entry along the Mexican frontier and see the trainload after trainload of American machinery, clothing, canned goods, fruits, and hundreds of other articles produced in the United States going into Mexico, they could not help having a feeling of pride and believing that these "friendly relations" are decidedly nice things; and then if these same readers could make a little trip to the interior of Mexico and become acquainted with the people, their delightful hospitality, etc., and hear the nice things that are said about American goods, their superiority over those of European manufacture, etc., every one of these same readers would feel like throwing his hat up in the air and yelling; "'Rah for Mexico an' Uncle Sam an' their friendly relations; keep 'em up!"

However, Mexico has "troubles of her own," and one of them is a scarcity of water for irrigation; and, as it is but natural for a person to tell his troubles to his best friend, so Mexico came to the United States with a plain statement of facts asking the relief which lies only within the power of the United States to grant. The outcome of this has been the proposed international storage dam to be constructed near El Paso, Texas, and the following is a brief outline of the situation today:

Away back in the year 1549, before there was anything known about the great West, the town of Paso del Norte was founded by the Spaniards, and the people in that vicinity (now Ciudad Juarez, Mexico, and El Paso, Texas,) carried on the business of agriculture by irrigation from the waters of the Rio Grande. From this humble beginning has grown the great agricultural industry of the Southwest of the present day, and the people enjoy the water rights here which have been handed down from the Spanish government centuries ago. In former years, aye, even up to ten or twelve years ago, there was sufficient water for all purposes,

and there was no such a thing as a dry river bed of the Rio Grande; but with the cry of "Go West, young man" and the subsequent rush from the Eastern farms and cities to Colorado and New Mexico, there began a scarcity of water in the river which has caused much suffering and poverty to our Mexican friends on the other side, as well as to the American farmers on this side of the river. The old established law of water rights says that the first in use is the first in right; but how has this law been respected? Did you ever see the lovely farms in Colorado and New Mexico along the Rio Grande, irrigated from the waters of that river? Did you ever see the ruins of once elegant farms in the Rio Grande valley near El Paso, on both the American and Mexican sides of the river, the deserted villages, abandoned fields and orchards—a pitiful state of ruin brought about by absence of the necessary life-giving water from the



VIEW OF AMERICAN SIDE OF THE SITE OF THE PROPOSED INTERNATIONAL DAM.
 river for irrigation? If so, you know well the story that is told by the two pictures.

It being practically impossible any more to make a living upon their farms, the owners and tenants thereof have been obliged to leave this section and go to other parts of Mexico and the United States in order to make a living for themselves and families. This would never have been necessary if the people could have had water for their land—water to which they are justly entitled by laws which have stood the test of ages and which are observed in other countries; yet in spite of their appeals, their prior rights have been trampled upon and they have been forced out of house and home in order that the later settlers a few hundred miles above, along the same river, might thrive and prosper by tak-

ing for their crops the water which rightfully belonged to the earlier settlers in this portion of the valley.

This water question has been one of great importance and has been carefully studied by President Diaz and his cabinet. A peculiar state of affairs exists in connection with this matter. While being aware of the ditches which were being taken out of the river in Colorado and New Mexico, still the inhabitants of the Mexican side have raised no objections as long as sufficient water for their use was allowed to come down the river. However, the improvements in Colorado and New Mexico continued until they represented expenditures of millions of dollars; and to insist upon the prior rights of Mexico and that the water be allowed to flow down the stream, would mean simply closing up the irrigating canals above and the abandonment of enterprises which had cost enormous sums of money. Thereupon, the Mexican government set about considering some plan by which this could be obviated, and came to the conclusion that the only way would be to construct a large reservoir by which the annual flood waters in the spring could be stored and distributed throughout the growing season for irrigation. Negotiations between the two governments along this line have been going on for several years, and ex-President Cleveland, in his message to Congress in December, 1894, referred to this matter as follows:

"Good will, fostered by many interests in common, has marked our relations with our nearest Southern neighbors. * * * * The problem of the storage and use of the waters of the Rio Grande for irrigation should be solved by appropriate concurrent action of the two interested countries. Rising in the Colorado heights, the stream flows intermittently, yielding little water during the dry months to the irrigating channels already constructed along its course. The scarcity is often severely felt in the regions where the river forms a common boundary. Moreover, the frequent changes in its course through level sands often raise embarrassing questions of territorial jurisdiction."

The two governments having at work in the field an International Water Boundary Commission, it was mutually agreed that this commission, should investigate and report to their respective governments on the following points:

1. Whether or not the citizens of Mexico in and near Ciudad Juarez have suffered any losses and damages on account of lack of water;
2. Whether or not these losses are due to water appropriations by American citizens in Colorado and New Mexico;
3. Whether or not the citizens of Mexico will desist from claiming damages if the United States government restores the water to them by dam or otherwise;
4. Whether or not the dam as proposed by Colonel Mills and Mr. Follett is practicable.

As to the first point, the Mexican government ordered an investigation conducted by the Federal Court at Ciudad Juarez, which demonstrated the fact that the population of Ciudad Juarez and vicinity has in the past

ten years decreased from 22,000 to 8,850 persons, that the deficiency in crops for the same period has amounted to \$22,000,000 Mexican money, and that the net loss during the same length of time to the owners of flouring mills and to farm owners was \$12,500,000.

As to the second point, the State Engineer of Colorado has supplied sixteen statements of filings and decrees for water, showing that up to the end of the year 1880 there were taken out in the Third Water Division of Colorado (the Rio Grande and its tributaries) ditches having a capacity of 4,495 cubic feet per second; and that since the first of January, 1881, there have been filings and decrees representing a capacity of over 21,000 cubic feet per second. In addition to this, reservoirs have been constructed with a capacity of nearly 2,000,000,000 cubic feet. The same proportionate increase has taken place in New Mexico, although no official records are obtainable.



VIEW OF MEXICAN SIDE, SHOWING RAILROAD TRACKS THAT WILL BE REMOVED.

As to the third point, the citizens of Ciudad Juarez and adjacent Mexican towns have authorized their government to waive any and all claims for past and present damages if the United States will build the Mills dam, as proposed, within a reasonable time and restore the water free of charges to them.

As to the fourth point, the only question was that of finding bed rock for the dam. The United States government appointed Capt. McClellan Derby, in charge of the New Orleans coast defenses, and the Mexican government Senor Ramon de Ybarrola, one of their most expert engineers, to assist the Water Boundary Commission in investigating this matter. Careful borings were made and bed rock was found at depths varying from 50 to 70 feet. The Commissioners then submitted their reports to their respective governments together with estimates as to the

cost of construction and stated that the dam was practicable in every sense.

Colonel Anson Mills is a typical American who has worked his way up the ladder of fame by his own efforts, and has just retired from active life after forty years of continuous service in the United States government, the most of which time has been spent on the frontier and throughout the great West—a hardy frontiersman in fact and a thoroughly practical man in the full sense of the word. The plan proposed by Mr. Mills is to build the dam at a point about two miles above El Paso, of stones and cement, about sixty feet high, one end to rest against the granite foothills on the American side and the other end against those on the Mexican side of the Rio Grande. It is certainly an admirable site for the construction of the dam, as a glance at the engravings will show. When the wall of masonry is built across the canyon (which at this point is about 500 feet in width), a lake will be created which will be fifteen miles long by seven miles average width, with a probable storage capacity of 4,000,000,000 cubic yards of water, the surface of which will be about seventy feet above the streets of El Paso and Ciudad Juarez. It will irrigate about 200,000 acres of land, or, in other words, 100,000 on the American side and 100,000 on the Mexican side, and will give a water power of about 6000 H. P. to each side of the river.

It will thus be seen that the benefit from the dam will be about equally divided between the United States and Mexico, and will be the means of reclaiming a lot of land on both sides of the river. The small engraving shows the Rio Grande river when the snows in the mountains have melted and the river is at its highest. If the enormous amount of water which flows down stream during the time of these floods, generally in the month of May, could be caught and stored in such a reservoir as proposed by Colonel Mills, it would insure sufficient water for irrigation throughout the entire summer.

The building of the dam proper will cost in the neighborhood of \$400,000, and the heaviest item of expense will be the cost of removing from the canyon to higher ground the Southern Pacific and Santa Fe railroad tracks, which may bring the total cost up to \$1,500,000, or over.

The matter of reclaiming the arid lands of the West is one which is receiving more attention every year, and it is only a question of time until the government will be obliged to take this in hand. Some of the enemies of the proposed international dam have claimed that it is unjust that the United States should build this free of cost to Mexico. They do not take into consideration, however, the justice of prior rights and the laws of water which can compel a man to close his ditch and let the water go down to parties further down stream who have prior rights. This is the law the world over and which has been handed down to us through ages. Now, Mexico, realizing the great loss which it would involve in Colorado and New Mexico to insist upon the water being allowed to pass down to this section, to which they are entitled by prior rights, have

offered as a substitute a plan which answers the same purpose and still leaves the investments and enterprises in Colorado and New Mexico intact and unaffected in any way. Then again, from a commercial point of view, the building of this international dam free of cost to Mexico will be worth many, many times the amount in the way of increased trade. The relations between the two countries are becoming closer and closer every year. Mexico has laid her resources at the feet of those who care to enter and develop them, and Americans are now investing in all kinds



RIVER AND SITE IN THE DISTANCE.

of enterprises in the Republic. They are well treated and are making money, as a general rule. The sons and daughters of many of the best families of the Republic are being educated in colleges of the United States, and schools for learning the English language are to be found in a large number of the cities and towns of Mexico. As stated in the beginning of this article, these people like American goods and the United States is now receiving a large portion of this trade which formerly went to England and Germany. Therefore, why should not these friendly relations be encouraged and this commerce increased?

To such proportions has this trade grown that England is being alarmed and is making a desperate struggle to retain it, as is shown by the latest scheme of the Rothschilds in their recent proposition to Mexico to assume the public debt of the Republic and have the exclusive privilege to colonize the unoccupied lands of the country, receiving therefor a certain sum for each family of emigrants and requiring that all public lands be withdrawn from the market, and certain other conditions? With

such a contract entered into, it would be good-bye United States goods.

Sooner or later the government must make a start in this matter of irrigation, and why not commence right now with this international dam? The opportunity is at hand to show an appreciation of the friendly relations existing with Mexico by acceding to their request in regard to the construction of this dam; and as the cement binds the rocks to form a strong wall of masonry, so will this act on the part of the United States be the foundation of a trade with Mexico which the schemes of the Rothschilds cannot budge or hinder in progress.

El Paso, Texas, November 18, 1897.

THE HAND FOR ME.

The hand that lends enchantment to
The harp-strings may be fair;
The hand that woe the sweet guitar
And makes the music there
May be a slender one and soft,
And beautiful to see,
But the hand that rolls the doughnuts is
The little hand for me!

The hand that is ablaze with gems,
May be the hand for you;
For some one else the hand that sweeps
The ivory keys may do;
The hand that goes with millions oft
Is beautiful to see,
But the hand that rolls the doughnuts is
The little hand for me!

My Bessie's arms are soft and round,
And she is plump and fair;
She's been away to cooking school
And learned some wonders there--
Oh, others' hands may be as small
And beautiful to see,
But the hand that rolls the doughnuts is
The little hand for me!

SOUTH DAKOTA UNVEILED---ITS RESOURCES AND NEEDS.

The following is an address delivered by Mr. John W. Hestin, president of the Agricultural College of South Dakota:—

South Dakota is really an empire in itself. It extends north and south 225 miles, and east and west 360 miles.

Comparing it with all the New England States it is one-fourth larger. With Illinois it is one and one-half larger and more than that ahead of Pennsylvania or New York. It is not located so far away as is often intimated; 600 miles almost due west of Chicago, and you are in South Dakota. This brings the state within easy reach of the great markets of the country and makes her products valuable and desirable.

The climate of South Dakota is not that of the frigid zones, but about the same as New York, Michigan, Wisconsin and Minnesota. Instead therefore of it being undesirable, it is a delightful state in which to live and its climate even exceeds that of many other states of the same latitude.

South Dakota resources are varied and extensive. For sake of convenience they may be divided into:—

1. The soil and climate.
2. Minerals.
3. Irrigation advantages.
4. Railway facilities.
5. Cheap lands.
6. Educational advantages.
7. Character of her people.

But a few words can be said on each of these topics in the time at our disposal.

The soil and climate need but little additional explanation. Nowhere in the state is there any lack of soil adapted to the various agricultural activities of the people.

For several years the state has been

recognized as valuable soil for cereals, grazing purposes and especially creamery interests.

It has just recently been discovered that the sugar beet can be grown to most excellent advantage. Tests made from more than 300 samples grown in various parts of the State, show wonderful results and adaptability of soil to this purpose. The sugar test has gone as high as 24 per cent in some samples and all tested stood above the 12 per cent necessary for commercial purposes. The following figures indicate the adaptability of the soil for agricultural purposes, and tell their own story. In 1896 the state produced:

31,136,950 bushels of corn valued at \$5,604,651.00; 27,583,450 bushels of wheat valued at \$17,101,739.00; 17,957,445 bushels of oats valued at \$2,334,468.00; 3,308,736 bushels of barley valued at \$628,660.00; 6,048,384 bushels of potatoes valued at \$1,209,677.00; 2,683,320 tons of hay valued at \$8,371,958.00.

South Dakota has 145 creameries now in operation and several cheese factories. The value of her monthly exported butter is about \$285,000.00. South Dakota butter leads in the markets of the world. There is none better anywhere.

The irrigation advantages of the state are important. There is a broad belt of country extending through the state from north to south called the Jim River Valley where abundance of water may be had anywhere for the digging. It is known as the Artesian basin and is of great value to the state. It is not always realized, but it is none the less true that irrigation is of great commercial value where it is possible and practicable. There are statistics to support this theory.

The total value of irrigated farms in the United States is \$296,850,000.00. That is 283.08 per cent upon cost including land, water right, fences and preparation for cultivation.

The total value of the productive irrigation system is \$94,412,000.00. 218.84 per cent upon their cost.

The average value of irrigated land in farms is 82.28 per acre and that of non-irrigated lands is \$20.95.

The annual value per acre of irrigated farms is \$14.89 and of non-irrigated it is \$6.80.

The railway facilities of the state are ample. The Chicago & Northwestern, The Chicago, Milwaukee and St. Paul each have a strong system in the state. The Great Northern and Burlington, also enter it.

Cheap lands is one of the strongest inducements the state offers. Good land may be bought for three dollars per acre. Land ranges from that up to \$25 per acre.

It is possible for dairy men as an example to secure the very choicest grazing lands at a merely nominal price and produce butter superior to anything else in the country at a price away below what is possible in a state like Illinois where land has become high and scarce.

The educational facilities are of the very best. The public school system is well developed and liberally supported. In every Township two sections are set aside as school sections and become a source of revenue at once. No other state in the Union has such an endowment for educational purposes. In addition to this the Agricultural College, State University, School of Mines and three Normal schools are in a flourishing condition and all liberally endowed by land grants from the State and National Government.

The character of her people is a matter of great importance and is worth emphasizing always. The people of South Da-

kota are intelligent, industrious and conservative. There is no disposition among them to boom their state, as is too often done in some sections of the west.

I do not mean that no effort is put forth to get settlers into the state. Far from it. There are several firms successfully at work in this direction but they do not employ the usual tactics of western land agents. They are reliable, truthful and honest men. I know one firm in my own locality, the Brookings Land Co., composed of the best men in the county and they have brought into our state some of the best families in this or any other state. These advantages of soil, climate, water, minerals etc., are inducements, not more important than those mentioned of education and characteristics of the people. Altogether they form some of the best opportunities to be found anywhere in the Union. But I cannot close these remarks without a comment of general nature on the subject of immigration.

It has been asserted that cities are over crowded and no one disputes this, but this question of immigration is a sociologic one and is not easy to solve.

To shift the overflow of cities to country seems but a natural solution of the problem, yet how can this be done and what better off would a helpless, penniless man be on the prairies of the west? Verily he would be more miserable than in the crowded marts of a great city. What is needed is to get capitalists who are philanthropists to develop some industries in this country which will give employment to large numbers of men and thus induce the crowds from the cities. That would be practical and might succeed well. When such men can be found South Dakota stands ready to welcome a dozen sugar beet factories and guarantees successful products for same and you have in one industry a profitable enterprise, a feasible solution of one great urban evil of your civilization.

THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs. Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

POLITENESS IN THE HOME.

It is said that "politeness costs nothing." But politeness does cost something, sometimes a great deal; but it is always worth more than it costs. A habitually polite, courteous person is necessarily a person of training, and such training should always be had at home. Parents have no right to expect teachers in the schools to give children their only lessons in courtesy and politeness. This is properly a home accomplishment, to be best secured in the home by the force of daily example.

This training, which is absolutely indispensable to those who hope to attain to the higher walks of life, should be the constant care of parents and should not be shirked in the least, or the duty falls upon teachers and others who have infinitely less interest in the child. Children in these days are a bug-bear to friends and neighbors, and are merely tolerated in most cases for the sake of peace with the parents. Many fond mothers believe their children faultless, while recognizing with rare discrimination the faults of other children. To the outsider, who sees more clearly, the children of one mother may be as disagreeable as those of another, and generally are. It is a lamentable fact that American children in general lack training in the home. They are early taught by over-indulgent parents (particularly mothers) that they can have what they want by crying for it,

or otherwise making things disagreeable in the household. They are thus taught the most arrant selfishness from the cradle, and the lessons thus early acquired are seldom forgotten. Children should be early taught to practice self-denial, as well as self-reliance and respect for their elders.

It is a sad commentary upon the way American children are brought up to see the notice everywhere, "No children wanted." This may seem barbarous, but it is merely a plain truth bluntly spoken.

Why are not children wanted? Mainly because they are disagreeable and have never been taught to respect the rights of others. This is the reason, and it is not because of any inherent or acquired savagery on the part of the average man or woman. Well-behaved children are always wanted; hoodlums never. But the relative proportion of the two classes of children in any community is so preponderating in favor of the latter that the general opinion seems to be pretty well grounded that there is little peace or comfort in the neighborhood of other peoples' children.

All this could easily be remedied in one generation, if parents could but know that their own children are much like their neighbors, and that if they are not taught consideration for the rights of others in the home, they will not learn it at all except later in life by hard knocks when brought into contact with those who

will not tolerate the hoodlum manners learned in their Christian homes, with scarcely even a mild protest of their too indulgent parents.

WINTER ON THE FARM.

A great many people think that winter on the farm is all leisure and no work, but that is all wrong. There is more care in winter than in summer. A farmer to be successful must feed all, or nearly all of his crops at home in order to get the top price for his product, unless he raises wheat altogether, which is rare. Where a farmer has to sell his grain in the fall he is compelled to take the going price, which is at that time always the lowest. He must haul it to market and stand all the waste in handling as well as wearing out his team, and a farmer will never make a success by doing so. To be successful he must raise or buy enough young stock of a kind that will grow and fatten with proper care and feed, and then watch them constantly, early and late, and note the improvement every day. He cannot lie abed mornings even though his stock have a warm, comfortable stable, for as soon as it begins to lighten up, they will be looking for something to eat, and if they do not get it will be restless and uneasy, which will not help to fatten any creature. By watchful care a man will be able to discern the improvement in his stock from day to day, and by keeping track of feed consumed will soon be able to tell if he is making or losing money. A man should never leave his stock alone long at a time for they get lonesome and consequently uneasy, they soon begin to look for their servant and feel more content when they can see him among them or hear him. Some farmers think all they have got to do is to throw the cattle a little feed in the morning and go off to the woods after a load of fuel, or hitch up and go to town and gossip with their neighbors, just so they can get back at night time enough to throw them another feed before going to bed. But it won't

work. No farmer ever made a success so and never will. Constant, unceasing care is required to make a prosperous farmer, and even more so in the winter than in summer.

EVAPORATORS.

The evaporator must come as a means of relief from the extortions of the greedy transportation companies. It is the only salvation now in sight, although canneries may come later and will no doubt prove a boon. Evaporation permits every fruit grower to become a manufacturer and the railroads will not get the hauling of so much water as in fresh fruits, the most of which are eighty per cent aqueous. One man in Delta county, I. Van Baalen, had a Zimmerman machine operating in his orchard this fall putting up 900 pounds of dried peaches.

SUGAR BEETS.

According to a bulletin on the sugar beet issued by the United States department of agriculture, beets do best after wheat or some other cereal. A good scheme of rotation is, first, wheat then beets; then clover, one crop of which is cut for hay and the second crop plowed under; then potatoes, wheat and beets in the order mentioned. By this method, and a judicious use of stall manure and commercial fertilizers, the fertility of the soil can be maintained and even increased. Beets should follow wheat or other cereal crop, because this crop, being harvested early, leaves the ground ready for late autumn plowing, a prerequisite to successful beet culture.

A PLEA FOR THE FORESTS.

New York Tribune: The lumber industry cannot, of course, be abolished. But it is high time such regulations were adopted and rigidly enforced as will prevent the utter destruction of forests. That is entirely possible. Not the mere amount of lumber cut, but the amount

destroyed, wasted by careless and injudicious methods, is what most counts. Every one who has visited a great lumber camp knows that more material is destroyed than is sent to market. The smaller trees, not large enough for marketable timber, are regarded as mere encumbrances, to be slashed and burned and got out of the way in whatever fashion may be readiest. The ground is thus entirely cleared. The beds of moss and leaf-mold, hitherto perennial reservoirs of moisture, are dried up. The soil and rocks are exposed, and the country transformed into a desert. What should be done is evident. The small trees should be carefully preserved, so that they may in turn grow to full size, and meantime shade the ground and preserve the forest conditions. Lumbering should, in brief, mean a judicious thinning out, not a wholesale destruction of the forest.

Tree planting should be practiced on an extensive scale, forest fires be more scrupulously guarded against, and the woodland area of the country be systematically cultivated, instead of ruthlessly raided. Other nations neglected the lesson long, but have learned it at last, and now enforce it with a strictness that here might seem despotic. But this nation is bound to come, sooner or later, to some such system of forest conservation, and it will be fortunate if it does not reach it through the ruinous experience of treelessness.

A GOOD SUGGESTION.

We are indebted to one of our subscribers for the following, which he suggests would be a good thing to place before our readers. We quote, with but slight alterations, as follows:

"Ask your subscribers what changes they would suggest in the AGE. Tell them that their interests are yours, and above all, that without their co-operation you fear you cannot prepare a bill of fare that will be acceptable to their mental palate. That, while there is any quantity of this mental food to be obtained for

them, it may not be served in a form that suits their needs. Ask them to write and tell you of their practical experiences--telling where they made a failure, either in raising or selling their crops; what methods they have found best, or whether they have a specialty in any one crop. In short, any bit of practical wisdom that they have learned and that, while it may seem like a slight thing to them, may prove of great value to some of the readers, who have not yet learned it in that dear school of experience."

We will be indeed glad to have our readers tell us anything of interest regarding the kind of soil they till, the crops they raise, the methods they employ, or the markets they find for their products.

NEBRASKA'S CROP FOR 1897.

Wheat, bushels.....	33,844,637
Corn, bushels.....	229,907,853
Oats bushels.....	69,389,944
Rye, bushels.....	5,392,507
Potatoes, bushels.....	8,045,802
Barley, bushels.....	2,889,574
Flaxseed, bushels.....	230,646
Hay, tons.....	4,630,143
Sugar beets, tons.....	104,000
Chicory, tons.....	5,500

VALUE AT LOCAL MARKET PRICES.

Farm products.....	\$ 99,570,965.21
Dairy products.....	9,438,000.00
Eggs.....	2,250,000.00
*Poultry.....	5,500,000.00
**Live stock.....	44,965,489.35

Total.....\$461,523,454.56

*Estimated. **Sixty counties only.

Wherever the actual facts were obtainable they were given. In the case of only a few counties was it necessary to make estimates and these were carefully and conservatively computed. This is probably as accurate a summary of the crop production of Nebraska for 1897 as can be given until the official reports of the state board of agriculture are published. Even these will be but little, if any, more ac-

curate, for the reason that the system for collecting facts is imperfect, in that it does not provide a penalty for neglect on the part of assessors to furnish a portion of the information desired.

GRAFTING.

As an example of how far grafting may be carried on and how successful one may be in grafting one plant upon another very different one, the *Literary Digest* of recent date gives a picture of a tomato vine grafted onto the stem of a potato. This experiment was successfully performed by a Frenchman named Balbet, proving that even vegetables of short life may be grafted if they belong to the same family, as do these two vegetables. "The water-gorged tissue of the potato thus serve as a reservoir for the tomato in case of dry weather."

The curious part of grafting, to my mind is, that while a certain plant or tree may be grafted on to another with perfect results, it is often impossible to transpose the two and have any success at all. As an example of this the pear-tree may be grafted upon the apple and grow and thrive for years, while the apple will not succeed upon the pear. Old as the art of grafting is—and it is probably as old as nature itself, as natural grafts are often seen in the woods—the explanation of this fact has never been found.

GRAY WOLVES.

The stockmen of Western Nebraska, South Dakota, Colorado and Wyoming are having a vast amount of trouble with gray wolves, which are very numerous, and so destructive to cattle that they intend to have a convention to talk the matter over and see if some plan cannot be devised for ridding the country of the pests. In Western Nebraska they are particularly numerous, and stockmen have tried poison, the cowboys carry revolvers and shoot wolves when seen, and while in this way it is estimated that about 10,000 wolves are

annually destroyed in the region embraced by the ranges in Nebraska, the ranchman still lose about 9 per cent of their herds each year by wolves. The losses are increasing yearly and the stockmen say that the gray wolf is becoming as great a curse to Northwestern Nebraska as the jack-rabbit is to Australia. Coyotes are numerous, but are so small that they cannot succeed in overpowering the cattle and dragging them down, but get in their work if they find the cattle lying down from any cause, when the little coyotes will pounce upon them and soon eat them, hide and all.

POTATO BLIGHT.

The potato crop of the past year in comparison with that of 1895-1896 is very much smaller and prices are correspondingly higher. In the years mentioned the crop was simply enormous and supply greatly exceeded demand, so that in some states potatoes sold for from 10 to 25 cents per bushel, while now they bring from 50 to 75 cents.

The cause of this shortage in a measure due to disease known as blight, which causes the potato to rot. In this connection Bulletin 140, issued by the Cornell University Agricultural Experiment Station at Ithaca, N. Y., gives valuable information as to the treatment of this disease, based upon experiments tried there. Notwithstanding that this has been an "off" year for potatoes, the experiment station succeeded in raising one of the best crops grown in three years, and that, too, without the lavish use of fertilizers, which some consider so necessary. No fertilizer had been applied for four years, but great pains were taken in preparing the ground, planting the seed and tending it afterward. The soil was plowed early and harrowed frequently; the finest, most perfect potatoes were selected and cut in large pieces, instead of merely cutting out the eye and planting that as many farmers do, each piece containing one or two strong buds. The rows were wide and deep, and five or six days after plant-

ing the field was gone over with a spike-tooth harrow and the land thus leveled. In this way there was no necessity for hilling the potatoes. The crust which forms after the spring rains is broken up by the harrow, making the ground mellow, and the stones and clods are raked into the hollows by the same means, thus giving the potato an easier chance to grow and expand. Weeds are destroyed at the same time.

But the most practical and valuable results of the experiments was the knowledge obtained concerning the nature of the early and late blight and its prevention. Blight is one of the cases in which "an ounce of prevention is worth a pound of cure." The early blight is often not recognized by the farmers, who think that the shriveled, yellow leaves and small potatoes are due to early maturity, for the potato does not rot. Hot, dry weather favors the attacks.

Late blight receives more attention as it is far more serious to the crop in its consequences, causing the potatoes to rot, and has been the cause of the failure of the New York crop this year. The potato famine of Ireland in 1846 was largely due to this late blight, as is also the scarcity this year, and therefore any remedy for the evil is of untold value. The disease is a fungus growth which attacks the leaves, causing them to turn first yellow, then black and shrivel up, emitting a strong, disagreeable odor, and the disease does not make its appearance until August or September. The remedy for the blight is a thorough spraying with the Bordeaux mixture, the formula for which is:

Copper sulphate.....	6 pounds
Lime.....	4 pounds
Water.....	45 gallons

From two to six barrels of this mixture per acre will be required, and if is used in time and with thoroughness it is a sure preventative. The experiment station had the potatoes planted in plats of one acre each and applied this solution by spraying to all the plats except one, and

while those sprayed yielded 305 bushels per acre, the plat not sprayed yielded but 234 bushels—a loss of 71 bushels per acre.

For making the Bordeaux Mixture the following directions are given: Suspend a gunny sack containing 40 pounds of copper sulphate, or blue vitrol as it is more commonly known, in a barrel containing 40 gallons of water. Suspend it near the surface of the water, cover the barrel tightly and it will keep good for a long time. The lime used should be fresh burned, caustic and not air slaked. To make up four barrels of the Bordeaux Mixture put 16 pounds of lime into a long, shallow, box, water-tight and add enough water to slake, stirring frequently. When you desire to use it, stir well and put one-fourth of it into a keg, and dilute with 20 gallons of water. Now put into a barrel six gallons of the dissolved copper sulphate, which must be well stirred, add enough water to fill the barrel half full and then put in the lime that has been diluted with 20 gallons of water. Strain this and the mixture is ready to spray on the plants. If you wish to kill potato bugs at the same time, add to this mixture from four to six ounces of Paris green. Apply with a strong force pump, stirring the mixture frequently so the ingredients will be evenly distributed.

SWILL-FED HOGS.

Swill-fed hogs are often subject to severe attacks, similar to hog cholera, yet which is not that disease because it is not of an infectious nature. While all the hogs fed on swill may be affected, those on an adjoining lot, that have a different kind of food, are immune, and this led farmers to suspect that the disease must be due to something in the food. Hogs that were raised on farms not far from the city, and that were fed on the swill collected from hotels, containing a great deal of dishwater, were more frequent sufferers.

This led to a thorough investigation among those interested in hog-raising, and

after repeated experiments it was found that the trouble was caused from the soap-powders used in washing dishes. The dish water fed to the hogs contained quite a large amount of the powder and the free alkali, sodium carbonate or washing soda it contains acted upon the hog, producing symptoms similar to cholera, often resulting in death.

In order to prevent the spread of the contagious cattle disease known as splenic or southern fever, Secretary Wilson recently issued a cattle quarantine circulars to all railroads and transportation companies, prohibiting them from transporting any cattle from January 15, to November 15, of each year (except for immediate slaughter) that come from the regions south of a line beginning at the Northwestern corner of California, thence east, south and southeasterly along the boundary of California, southerly along the western boundaries of Arizona and New Mexico, northerly to Colorado, along the southern border of Colorado and Kansas, Missouri and Tennessee, to Virginia, and along the northern boundary of Virginia to the Atlantic ocean. All cattle infected with southern cattle tick shall be treated as infected cattle, as the tick serves to disseminate the disease. It is hoped by these measures to prevent the spread of the fever.

A number of our exchanges claim that the free distribution of seeds by the government should be stopped. In 1896, according to one journal, twenty millions of packets of seeds were distributed free, and this was a positive injury to a branch of industry and did not fulfill the purpose for which it was intended, namely, that of introducing new varieties of seeds into different sections of the country.

Globe-Democrat: The four adjacent states of Missouri, Iowa, Kansas and Nebraska, have raised over 950,000,000 bush-

els of corn this year. That looks like good times, and it is only one of the items.

It is estimated that 1200 cars of potatoes will be shipped from the town of Eaton, Colorado, this year.

DAIRY NOTES.

Too much linseed meal will injure the flavor of the butter.

The less hard contact the butter gets the better it will be.

Rough feed goes further and is easier digested if chopped.

Feeding wheat bran alone will make the butter pale in color.

Cottonseed meal gives rich milk, but should not be fed alone.

Churning at too high temperature or too long will produce greasy butter.

Salt added to the water will help materially to draw out the buttermilk.

There is no other breed which is as uniform in their dairy qualities as the Jerseys.

To keep the cows in a good, thrifty condition they require change of diet frequently.

Milk should be shut off from all noxious odors and the cream separated as soon as possible.

After gilt-edged butter is made, the proper place to get the full value for it is from the private customer.

In determining whether or not a cow is a profitable animal, everything she produces should be counted.

In making the most out of cows, in many cases it will pay to have some fresh in the fall for winter dairying.

The dairyman should raise all the feed he can, feed all that he raises, and then as much as he finds necessary to keep his cows well.

Good water and good feeding, essential as they are to the best success in the dairy, will not make a profitable cow out of a poor milker.

The principal reason why winter dairying can be made most profitable is that in nearly all cases higher prices can be readily obtained.

With proper care in management, the more feed the cow can be made to consume and turn into milk the greater will be the profit.

Good succulent feed in the winter is necessary to the maintenance of a good milk flow. Now is the time to look after this.

All working of the butter after the salt is incorporated is injurious to the grains of the butter. Work only sufficiently to get into a proper shape to send to market.

CHILD-HOOD FANCIES.

When'er at night the thunder
Went rolling o'er our heads,
I said that God was pulling out
The angels' trundle beds.

At evening, as I watched the clouds
Go moving softly by,
I used to cry, "Oh, come and see,
The circus in the sky!"

For in these clouds strange forms I saw
Of beasts and birds and men,
Moving in swift procession, far
Beyond my childish ken.

And in these downy, fleecy clouds
That were so soft and white,
I sometimes saw my mother's face
All radiant and bright;

And hosts of angels with bright wings
And trumpets in their hands—
They changed again to palaces,
And then to fairy bands.

Oh! wond'rous panorama that
Unfolded to my view;
Oh! wond'rous golden fancies
That I in child-hood knew.

No longer can I see as then
The visions in the sky,
No time have I to watch the clouds
As they go floating by.

My fairies and my palaces,
My ships and angels too
And many another fancy
Have faded from my view.

I'm older now, and wiser too—
But ah, to sit once more
In innocence and happiness
Beside our kitchen door,

And see once more the pictures that
I saw with childish eye
When I used to watch the circus
That was passing through the sky.

—L. W.

PULSE OF THE IRRIGATION INDUSTRY.

CULTIVATION AFTER IRRIGATION.

A S generally applied irrigation leaves the soil compact and in condition to become very hard as it dries says the Field and Farm. The compacting of soil after irrigation is remedied by cultivation of the surface as soon as the soil reaches a condition to be worked, as explained in an irrigation paper of the United States geological survey. This cultivation after irrigation serves the double purpose of checking the growth of weeds, which is sure to be copious, and of leaving a soil mulch of loose earth over the surface, which prevents the rapid evaporation of the moisture stored in the subsoil. The importance of cultivation after each irrigation cannot be overestimated.

In general the application of water without the subsequent cultivation is of little value, and, indeed, in many cases it is absolutely detrimental. The general experience is that, with the average soil, after the application of water the ground soon becomes very dry and very hard and evaporation proceeds to rob both the soil and the subsoil of moisture with surprising rapidity. If the irrigator thinks to remedy the case by another irrigation, he usually only makes the matter worse, for the soil by this time, especially that along the borders of the furrows, has become quite thoroughly puddled, so that the second application of water with no intervening cultivation amounts to little more than flooding over the surface, with but slight moistening of the under soil.

It may be stated in general that the irrigator who fails to cultivate soon after each irrigation will make a failure of irrigation. Indeed, in almost any part of the great plains, if either irrigation or cul-

tivation must be omitted, it will be better to omit the irrigation than the cultivation for all such crops as admit of cultivation. The case with meadows and with sowed crops in general is somewhat different, the soil being to some extent protected and supported against excessive settling by the general distribution of the plants and roots.

It is not improbable, however, that in the case of annuals, as wheat, rye, barley and oats, it will be found profitable to make the drill rows far enough apart to admit of cultivation while the plants are small. In the case of meadows, especially with alfalfa, the influence of the extensive root growth is such as to keep the soil in condition favorable to rapid growth without cultivation. It is noticeable, however, that even alfalfa shows the marked influence of cultivation where a meadow of this legume joins a cultivated field.

GREAT DAMS IN SPAIN.

With the possible exception of the ancient dam in Ceylon, the oldest masonry dams in existence are in Spain, where irrigation is as necessary to successful agriculture as in India. The oldest of the Spanish dams is that of Almanza, 68 feet high. The date of its erection is uncertain, but it is known to have been in use in 1586. The great dam at Alicante was finished in 1594. The name of its builder is not known with certainty, but it has been attributed to Herreras, the famous architect of the Escorial palace. It is the largest of the ancient dams, being no less than 134.5 feet in height. Other Spanish dams which are large enough to deserve special mention are, with their heights, as follows: Elche, 76 feet; Nijar, 101.5; Lozoya, 105; Val de Infierno, 116.5; the two dams at Hajar, each 141, and the great

dam at Villar, which is 170 feet high. The latter is built on modern lines, and is one of four which overtop all other dams now in existence. These are the Periar dam in India, 173; the Furens dam, in France, 170.6; the San Mateo dam, in California, which is the same height, 170 feet, as the one at Villar. The builders of the ancient Spanish dams seem to have proceeded mainly upon the idea of piling in plenty of material, and while some of their work has stood secure for centuries, some is said to have failed because the foundations were crushed by the sheer weight of the enormous masses of masonry piled above them.

To the French belongs the honor of first making a scientific investigation of the best forms of profile for masonry dams, and the dam at Furens was the first to be constructed in accordance with the results of these studies. It was built to protect the village of St. Etienne from the disastrous floods to which the Furens river is subject, the discharge sometimes rising as high as 34,600 gallons per second, while the average flow is 130. This dam, which was completed in 1866, was not only much higher than any that had been built up to that time (170.6), but its graceful, slender outlines constituted a daring departure from previous methods. Colossal dams are now so numerous in all parts of the world that a mere catalogue of them would fill a page. A few of the more noteworthy are given in the following table:

	Height.
Tytam, China.....	95
Gorzente, Italy.....	121
Haniz, Algiers.....	135
Vyrnwy, Wales.....	136
Bar, France.....	152
Gileppe, Belgium.....	154

—*Washington Post.*

to undertake the construction of this canal, were recently prepared, and the stock and subscription lists are getting substantial support.

An irrigation convention was recently held at Lawrence, Kan., but though well attended and well conducted, practical irrigation has not yet made much headway in the state.

RAILWAY STATISTICS FOR THE WHOLE COUNTRY.

The ninth statistical report of the Interstate Commerce Commission, just issued, contains some interesting figures. One hundred and fifty-one roads, representing 30,475 miles, were in the hands of receivers June 30, 1896, a decrease of eighteen from the previous year. The capital stock of these roads was \$742,597,698, and the funded debt \$999,733,766. The total railroad mileage of the country was 182,776, an increase of 2,119 miles. Georgia shows an increase of 233 miles, the largest shown by any state. These roads used 35,950 engines and 1,297,649 cars. The railway employes number 826,620, and they received 60 per cent of the total operating expenses, a slight decrease from the previous year. The total railroad capital was \$10,566,865,771 which shows a capital of \$59,618 per mile, and if current liabilities are included as part of the capital, it reaches \$63,068 per mile. The number of passengers carried reached 511,772,737, an increase of 4,000,000. The freight tonnage was 765,891,385, the largest ever reported by the roads of this country and an increase of nearly 70,000,000 tons. The gross earnings were \$1,150,169,376, an increase of nearly \$75,000,000, making a net income of \$33,000,000 more than during the previous year.

The proposed irrigation canal down the west side of Cache valley, Idaho, bids fair to be a great success. The constitution and by-laws of the company that is going

A Wisconsin paper says that "cigarette smoking is offensive to those who are opposed to it." And it is opposed to those who are not, as the mortuary records prove.

ISHMAEL.

By L. R. WING.

"His hand will be against every man and every man's hand against him."

That was not his real name of course, but someone with an eye to the eternal fitness of things had called him Ishmael, and as Ishmael he was known "on the road."

How vividly I recall my first meeting with him! I was working at my desk one day when a shadow fell across my paper, and looking up I saw in the doorway—Ishmael. I recognized him instantly from descriptions given of him by acquaintances. He was a large, powerfully built man with the massive head that betokens intellect, keen grey eyes and a determined mouth. He was clad in a suit of grey, which from exposure to the elements had shrunk, giving him the appearance of a schoolboy who has outgrown his garments. This was probably due to one of Ishmael's many peculiarities—that of not being able to see after dusk, so that wherever night overtook him on his wanderings he was obliged to camp right there until morning. Numerous all night soakings had so abbreviated his trousers that they were not on meeting terms with his shoe-tops; his vest was destitute of buttons, and his suspenders were an illustration of the old adage, "Necessity is the mother of invention," for where they had broken he had fastened the ends together with staples such as are used in binding pamphlets. His coat was evidently of an aspiring character for it had the appearance of ever striving for something higher, and had succeeded so well in its efforts that the buttons which should have adorned it at the waist line were now halfway between the waist and shoulders. The fact that this garment served as a bookcase also, containing as it did Ishmael's entire library,—Shakespeare, a dictionary and a grammar,—did not improve its appearance. In fact, from the crown of his shaggy, unkempt head covered by a dilapidated felt hat, to the soles of

his well-worn shoes, through which his toes were plainly peeping, Ishmael bore the unmistakable signs of being, not only a tramp, but a tramp in very hard luck indeed.

Of course he was tired and hungry, and out of money and when he asked the usual question, "Got any work boss?" the proprietor could not find it in his heart to refuse him; and so Ishmael became a member of the very small force that got out the weekly paper. And a very useful member he proved himself to be; not only could he write an acceptable article or good story on short notice, but he could also "rattle up the type" with the best of them. When I add that he was by trade an engraver, it will be seen that he was a man of varied talents, who had no need to be tramping about looking for work.

We soon learned why his companions had called him "Ishmael," for like the man of scriptural fame, his hand was against every man and he believed every man was against him. He was decidedly the "man with a grievance;" always on the lookout for a slight or snub. Every chance word or unthoughted joke was magnified by him into a premeditated insult. He treated us all with a haughty disdain, as became one so greatly our intellectual superior, and this attitude, as may be imagined, did not tend to make him universally popular.

There is no one so thoroughly democratic as the tramp printer, no one so entirely independent as he, and no one who has such a lack of reverence for the "powers that be." Ishmael was a striking example of this. With all the seriousness in the world he criticised the grammatical construction of a sentence written by the high school professor, and was entirely innocent of having given any ground for offense when he remarked to that worthy that "there wasn't one school teacher in ten who knew the first thing about grammar."

And who so keen as Ishmael to discover the flaws of the contemporary news-

papers! How he could pierce them with the shafts of his sarcasm; how he could wound them with the darts of his wit—for he was witty in a bitter ironical way, but it was a wit that always caused a sting as well as a laugh. Those with whom he came in daily contact were, as a rule, unable to cope with him and feared his vicious home thrusts, so that he stood in comparative isolation, making but few friends and apparently caring nothing about his companions. During the day he had his work to occupy him and in the long evenings, when his active brain was not busy weaving some fantastic tale which his ready hand transferred to paper, he played long games of solitaire—games lasting far into the night, in which he claimed Satan as his opponent. If he won the game he went to bed triumphant, remarking gleefully, "Well, I've beat the Devil!" but if the cards failed to come out to his satisfaction, after repeated trials, he would throw down the patesboards in disgust and with an impatient exclamation (for strange to say he never swore) seek his room, forgetting his lamp in his anger, and go to bed in the dark, feeling that even the Devil was leagued against him.

Weeks rolled away and Ishmael remained with us, just as shabby, unkempt, and—truth compels me to add—dirty, as when he first dawned upon my vision; it was I think his natural state. But there was one little relic of refinement that he clung to in all his vicissitudes—his toothbrush. Dirty he might be, often going all day long with no pretense of combing his hair, but his toothbrush was in daily demand and his teeth were beautiful in their immaculate whiteness. "From the fullness of the heart the lips speaketh," says the bible, and upon receiving his first week's salary Ishmael spoke as follows: "I walked into this town tired, hungry and penniless: for days I had slept in the fields, with cows for my room-mates. Now I sleep in a bed, have three meals a day and money in my pocket. I tell you I feel like a bloated bond-holder!"

The proprietor decided to try what effect a good suit of clothes would have upon Ishmael and so bought him a complete outfit, including an overcoat, for the weather was growing cold. For the first time in years Ishmael was well dressed and was a fine looking man, for while dress does not make a man the lack of suitable clothes does much to mar him. Our hero belonged to that numerous class who cannot stand prosperity; "Boss," said he when arrayed in his new apparel, "I just can't work today same as if nothing had happened; you'll have to give me a day off to get used to these clothes. I just can't work." So he was given a "day off" and spent it in walking the streets, up one side and down another, gazing in the windows at his reflection, and enjoying the admiring and astonished stares of the townspeople, who could scarcely realize who he was.

He now had a good situation, good clothing, money in his pocket, and as I watched him I thought, "surely now with his talent he will make something of himself." I found that I had not yet discovered what natural aptitude the man had for being a failure.

One day the proprietor was called to an adjoining town on business, and after giving us all our work for the day, he laughingly installed Ishmael as foreman during his brief absence. Ishmael took the joke in all seriousness, and after donning a clean paper collar, as the outward and visible sign of his new dignity, he took a fresh chew of tobacco and proceeded to exercise the authority that he imagined himself invested with. Never have I received so many orders in an equally short space of time as I did that forenoon. Not a stroke of work did our "foreman" do that day, but when not finding fault he walked to and fro giving his views on every known subject, from geometry to religion. Seeing at length how lightly we regarded his authority, he very formally and in choice parliamentary terms, gave up his office, and informed us that "things might go to smash now, he would hold himself re-

sponsible no longer." This statement was received with such open hilarity that with a scorn which should have withered us he relapsed into poetry, saying

"Blow, blow, thou winter wind,
Thou art not so unkind
As man's ingratitude."

"I don't suppose any of you know it, but that's Shakespere!" with which parting sarcasm he left us and proceeded to drown his sorrows in the beverage well known to printers, which not only cheers but also inebriates. He drank steadily all day and when the proprietor returned in the evening he found a very towled and disheveled Ishmael, who had very hazy ideas as to the occurrences of the day but was extremely positive that he was "all right." With a breath like a distillery he assured the proprietor in the solemn tone adopted by the drunkard, that he was perfectly sober. No one argued the point with him.

As he began to sober up, which he did in the course of a day or two, he became harder to get on with than ever. He was firmly convinced that we were all against him and trying to "down him" as he expressed it. Innocent remarks were regarded by his distorted brain, as being covert sneers and insults. The crisis came one day when he demanded that the proprietor make a choice between him and one of the other employees, as Ismael declared it was impossible for both of them to work longer in the same place. The proprietor soon made his choice—but it was not Ismael.

He came in to bid me good bye. "Did you ever see a tourist's trunk?" he inquired. I responded in the negative, whereupon he produced a large collar box in which were two paper collars, a pair of socks and a handkerchief. "These," he remarked pathetically "are my worldly goods. I can't stand prosperity. I'm going back on the road again to tramp about in all kinds of weather; to share my sleeping apartments with the cows and oak trees. There is only one drawback about such bed fel-

lows, trees are apt to roll around a good deal and the cows snore so. Then, too, on these cold nights you're apt to get most too much of a draft in your bedroom through the barb wire fences, but I'm used to that sort of thing, and after all cows are better friends than most men you meet." With a shake of his head he stowed away in his capacious pockets his Shakespere, grammar, and dictionary and with his precious "trunk" in his hand, he pulled his hat over his brows and started out once more on the road.

In a short time his new garments would be shrunken and weather-beaten and he would be again the same seedy-looking individual that he was a few months before.

I viewed his departure with sincere regret; for it seemed such a pity that one with his talents and naturally fine ability should allow his mind to become so distorted that he regarded his fellow men as his enemies—women he held to be of so slight importance that he did not consider them at all. He was now about 40 years of age, and the better part of his life was gone—his talents almost wasted, a grand career spoiled, because of this suspicious, sensitive nature, that looked upon itself as the plaything of a cruel fate.

More than a year passed, and during that time we had heard nothing of Ismael, when he unexpectedly put in an appearance at the office, looking as usual the step-child of fate, but apparently delighted to meet all his old acquaintances once more. His stay this time was very brief. In the course of a few weeks he contrived to quarrel with nearly all of us and be insulted times without number—unwittingly I was the chief offender in this instance—and, in a moment of anger, he once more "left for parts unknown," as our contemporaries say.

Several months ago we received a long letter from Ismael. All his wrongs were evidently for the time being forgotten and we were taken to his heart again.

The letter, which came from Western

Iowa, was written in his happiest vein and gave an entertaining account of his adventures and surroundings. He was in a singularly hopeful mood, and had as many schemes in his head as the renowned Col. Sellar. The letter, which was chiefly addressed to the "boss," concluded as follows:

"I have two splendid plans to make money and I wish you to join me in one of them. There are thousands to be made in either of them. One is the great horse hoof remedy, of which you have often heard me speak. I have the recipe for making the medicine, which will cure any disease of the hoof, and if you will go in with me we will manufacture it, and I tell you there's thousands in it. My other plan is for you to join me in a walking tour from here to the Pacific coast, writing weekly letters to the papers, giving an account of the trip. What do you say? Please let me hear from you at an early date. Yours, etc.,

ISHMAEL.

As the proprietor did not feel inclined to give up a paying business to enter into this money-making enterprise, the letter remained unanswered, and I presume Ishmael regarded his failure to respond as only another blow from unkind fortune, and became more embittered then ever.

Poor visionary! I wonder if he is still "dreaming dreams" of the great fortune that was always like the cup of Tantallus, just beyond his reach; did his skillful hands achieve something for him after all, or were they folded across his breast with their work all unaccomplished; his hopes all unfulfilled?

GOOD PRECEDENT.

A crosswoods jury in a Georgia justice court brought in this verdict:

"We, the jury, find the prisoner guilty of hog stealin' in the first degree, an' recommend to hang him."

"But," said the justice, "you have no authority to hang men."

The foreman looked puzzled, scratched his head and said:

"Well, yer honor, that mout be, but my experience is that we has hung a great many of 'em."—Atlanta Constitution.

THE BILL HE WANTED.

"Kunnel," said an old Georgia darkey, "will you do me a favor when you's up ter de legislatur?"

"Certainly," replied the representative "if it's in my power. What is it?"

"Don't dey have lots of bills up dere, suh?"

"Oh, yes—lots."

"An' you'll be comin' home 'bout Christmas, suh?"

"Yes."

"Well, suh, do—if you please, suh—bring me a two-dollar bill!"—Atlanta Constitution.

POINTED PARAGRAPHS.

Lantern-jawed men are not always light headed.

The most of the slips occur after the cup has been to the lips.

Tears of joy and sadness are both drawn from the same tank.

Some people, like bricks, are always hard pressed for cash.

No jeweler has ever been able to improve on the setting of the sun.

The man who has a telephone in his office is charged with electricity.

When a woman drives a man to drink he always makes a good time record.

Time may be money, but some people's time is about as valuable as confederate currency.

Beauty would be more than skin deep if the average female complexion be figured in the deal.

When an actress wears her diamonds while in bathing, it's simply force of habit; she's used to having them in soak.

The fabric of a ready-made suit may not be of the best, but the fabrications of the dealer are usually the real thing.

—Chicago Daily News.

STATE NEWS.

COLORADO.

Colorado intends going into the raising of sugar beets for "all there is in it". Half a ton of sugar beet seed is to be sent out by Secretary Wilson to the Chamber of Commerce of Denver, and from there distributed throughout the state to those who wish to try raising beets.

The National Stock Growers Convention is to be held in Denver, Colo., Jan 25 to 27 inclusive. Over half the governors west of the Mississippi have accepted invitations to be present and those who can not attend have written letters very heartily endorsing the aims of the convention.

There is talk of holding an international exposition at Denver in 1901 to celebrate the 25th anniversary of the admission of Colorado into the Union.

The Delta Independent of Dec. 24 calls attention to what is styled the "grievous inaccuracies" of Bulletin No. 6 recently issued by the division of pomology of the United States department of agriculture. The Bulletin divides the country into fifteen groups, of which Colorado, Utah, and Nevada, the portions of district, in Arizona, New Mexico and Texas north of the thirty-fifth degree of latitude are grouped in district 12. There are 230 well known varieties of winter apples that can be grown in this country and some states will grow nearly all these kinds. The Independent says that when this Bulletin claims that Colorado can raise but twenty varieties of apples, it not only does the state great injustice as to its fruit raising abilities, but gives a very erroneous idea to fruit growers throughout the country as to Colorado's resources. Delta has shipped 160 cars of fruit this season, besides its express shipments.

Another effort is being made by the residents of the North Fork country on the Gunnison river to secure railroad connection by building a line joining the Rio Grande Western at Delta and running up the North Fork valley to Hotchkiss and

Paonia. This was attempted two years ago, but was unsuccessful, owing to the hard times. It is to be hoped the venture will be a go this time, as the valley is one of the most fertile in the state.

CALIFORNIA.

SAN DIEGO RESOURCES.

A San Diego correspondent figures up the following as the more important annual resources of San Diego, the figures not including products of manufacture, nor the expenditures in trade and commerce, or of corporations handling cargoes by rail and water:

"Live stock, hides, wool and honey, \$200,000; grain, hay and other field products, \$350,000; fruits, nuts and olives, \$500,000; mining product in bullion, \$500,000; fish product brought into this port, \$200,000; expenditures for shipping supplies, repairs and by men on local, coasting and foreign ships, \$200,000; expenditures for supplies and for men by the government for the army on fortifications and harbor improvements, \$150,000; expenditures by summer and winter tourists, \$1,000,000, making a grand total of \$3,100,000.

Santa Barbara is to have a celery farm of 200 acres. There is a great field for the production of that popular vegetable in this valley, but no one has yet undertaken to occupy it.

Tulare now comes waddling proudly to the front under the weight of 237½ pounds of pumpkin. That pumpkin would do more missionary work for this valley in New England than a dozen real estate agents.

Visalia has contracted to have her streets lighted by electricity and will pay \$10 per month for each light, moonlight schedule. Fresno pays little more than half this price for all-night lights, but then Fresno has one of the greatest water-power electric systems in the United States.

The Valley road has ordered one hun-

dred new box cars, its freight business having reached such proportions that it cannot be handled with the number of cars which it was supposed would be sufficient. The competing road is an unqualified success.

Damage done by the rainstorm in Fresno, Tulare and Kings counties is estimated to be about one-third of the raisin crop. Last season 1500 cars had gone forward to the east prior to October 15. This year the shipments have been only 400 cars. It is said that the storm has caused the loss of 1,000 carloads. Growers are holding for 3½ cents a pound in the sweat box.

The ranchmen of San Diego, Co., say that several large mountain lions have recently been seen in the Moosa canyon.

President McKinley is to receive a unique invitation to attend the California golden jubilee. The invitation is to be engraved on a slab of gold quartz. This golden jubilee and fair, which is to be started about the 24th of January, will be the first active advertisement of California's gold resources since their revival. The San Francisco Miners Association propose to "head off" in this way some of the people who contemplate going to the Klondike in the spring.

Fresco, Cal., is to have the largest electric pumping plant in the world and it is of latest make with all modern improvements. It is now being placed in the pumping station of the water works and has a capacity of 4,000,000 gallons every twenty-four hours. The water is obtained from seventeen artesian wells that reach a depth of from 200 to 600 feet, and is therefore pure and healthful.

The El Cajou Packing Co. has put in a new Fresno raisin stemmer of 20-ton capacity. The company expects to handle about 600 tons of raisins.

San Diego has a smoked herring factory.

Redlands is having a "boom". Building is progressing at a great rate, one of the finest structures in progress being the public library building, the foundation walls

of which are laid, and which will cost when completed not less than \$60,000.

ILLINOIS.

A recent heavy rain at Paducah, uncovered what was supposed to be a bed of coal. The farmer upon whose land the discovery was made immediately began digging and the vein proves to be a very rich one.

On the evening of Dec. 29 the Austin Mfg. Co., located at Carroll avenue and north Carpenter street, was burned. One man, an employe was burned to death while attempting to check the flames. The Austin Company is well known as manufacturers of road machines, and the loss is estimated at about \$60,000, covered by insurance to the amount of \$100,000. The walls of the factory are still standing and it is believed some of the heavier machinery may be saved. The Austins intend rebuilding immediately.

KANSAS.

Topeka is to have a woolen mill.

The registration at Topeka has reached 8,531.

Washington county claims the record in the production of corn this year.

A bed of fossils has been discovered on the Colvin ranch, near Oberlin. The petrified bones of mammoth turtles predominate.

Salina is considering the advisability of buying the paper mill and converting it into an electric light plant to be owned and operated by the city.

After July 1, 1898, Kansas will own all of its bonded debt, except an issue of \$25,000. The School Fund Commission will purchase \$84,000 of the bonds and of the \$632,000 of state bonded debt, \$601,000 will then belong to this fund and the interest on it will be used to support the common schools of the state.

The annual meeting of the Kansas Board of Agriculture will be held at Topeka, beginning January 12, and continuing three days. From the program, pub-

lished in the Topeka Advocate and News, it promises to be a meeting of more than usual interest to farmers. The Kansas railroads will probably grant the usual reduced rates.

County Treasurers in this state say that a very large number of tax-payers are paying their taxes promptly this year and in full instead of letting half of it go over until next June.

UTAH.

Thomas H. Cavenaugh, manager of the Lake Bonneville Irrigation company, of Utah, closed a contract with the Utah state board of land commissioners for the reclamation, under the Carey act of 300,000 acres of land in Millard county. About \$2,500,000, is involved in the contract. Morton B. Hirsch of Philadelphia, is president of the company. It is claimed that this enterprise when completed will nearly double the irrigation lands of the state.

A \$3,000 wreck occurred near Ogden, Utah; the Oregon Short Line passenger train collided with a switch engine of the Southern Pacific. No one was injured, but the engines were badly broken up.

Towns in Weber county are offering inducements for sugar-beet factories to locate there.

WYOMING.

The Badger Canal company has been incorporated by T. P. McDonald, Arthur Barney, Joseph Smith, James Broadley, Hiram Pierce and others of Carbon county, Wyo. The company is organized for the purpose of constructing a ditch for irrigation and manufacturing purposes from Rock Creek to Dry Creek and from Dry Creek to Sand Creek, Carbon county. The capital stock is \$20,000, and the shares have a par value of \$10.

DEVIOUS DEFINITIONS.

Nobody—A prominent woman's husband.

Gossip—A deadly gas that is often fatal to friendship.

Statistician—A man who can prove that figures always lie.

Thunder—The only reliable weather report yet discovered.

Hammock—An article used as a spoonholder at a love feast.

Matrimony—A sort of trust for the protection of infant industries.

Perambulator—A good thing that but few men care to push along.

Pedestrian—A person who is always getting in the way of a bicycle.

Because—Eve's legacy to her daughters as an excuse for the inexcusable.

Experience—Something everybody gets after it is too late to make use of it.

Definition—Something looked up in the dictionary today and forgotten tomorrow.

Faith—The thing that makes a bald-headed man invest in a bottle of hair restorer.—Chicago Daily News.

A FEW SQUIBS.

Old widows are looking for youth and the youth must be careful.

The sugar trust has been in pretty hot water lately, but it hasn't been dissolved yet.

Mrs. Lease says that "the man of the future will go on all fours." Will it be easier then for the new woman to force him into a bridal arrangement?

Tom Watson says he "sees eight lions right ahead of McKinley." If Thomas doesn't leave Georgia "moonshine" alone he'll probably see the rest of the menagerie pretty soon.

The Kennebec Journal tells of a wedding serenade that "fushed out." We don't know what that serenade did, or why it was done, but "fushed out" seems to be good enough to save.

A Michigan girl confessed to the pastor that she has received attentions from seventeen beaux and that fifteen of them had kissed her. The two milksops who failed to do their duty deserve to be tapped for the "simples."

WITH OUR EXCHANGES.

THE FORUM.

In view of the fact that the Cuban and Hawaiian questions are receiving so much attention the leading article in the December Forum is of especial interest. It is entitled "The Policy of Annexation for America," and in it the writer, Hon. James Bryce, P. C., M. P., of England, gives his reasons for thinking that the annexation of either or both of these countries would be bad for America. The third installment of "Notable Letters from my Political Friends" is given in this number. Other subjects treated of are: "Unconstitutionality of the Hawaiian Treaty," contributed by Daniel Agnew; "The Wolcott Commission and its Results," by Hon. James Eckels; "The National Guard and our Sea-Coast Defense," by Capt. J. C. Ayres, and "Railway Pooling—from the People's Point of View."

MCCLURE'S.

The January number has an unusually pretty cover in honor of the new year, the colors being particularly harmonious. The inside is equally attractive. Two stories of every-day people and common-place events are well told, one "Accordin' to Solomon," and the other "Sairy Spencer's Revolt," tells the pathetic tale of a farmer's wife who rose in rebellion against the monotonous drudgery of her life, unbrightened by words of sympathy or kindness from her husband, and at length—but "that would be telling. Suffice it to say that many a farmer can get from it profitable hints. Under the heading "The Life of the Railroad Man," an old railroader relates some of the adventures occurring during his fifteen years' experience on the road. Robert Barr gives, besides his story of "The Long Ladder," a sketch of Samuel L. Clemens, or "Mark Twain," as he is more commonly known. There is also

a sketch of the renowned John Brown, and a continuation of the Dana Reminiscences.

SCRIBNER'S.

In the January issue we are given the opening chapters of the serial story, "Red Rock," written by Thomas Nelson Page, which are full of promise. Henry Cabot Lodge takes us back a hundred years as he tells of the beginning of the war of the revolution under the title "The Story of the Revolution." The article is finely illustrated with pictures of historic interest, one of the prettiest being that of Concord bridge at the present time. "Lizzard Castle," is one of the short stories.

REVIEW OF REVIEWS.

The January number takes up the topics of current interest and deals with them in the usual interesting manner. Some of the most important things discussed are: "Plans for Currency Reform Before Congress," in which Charles A. Conant compares the plans of President McKinley, Secretary Gage and the Monetary Commission; "The Sea-Power of England and the United States," an article consisting of three divisions, the first entitled "The Position of the British Navy," written by Lord Brassey, the second division is a letter from Mr. Roosevelt in answer to this, and is in regard to the rebuilt navy of the United States and the third is "Our Need of a Navy" an extract from Capt. Mahan's new book.

The Cheyenne (Wyo.) Daily Sun-Leader has a very attractive Christmas number. The body of the paper is in a bright blue and the heading and an outer border in a pretty shade of red. One of its leading articles is concerning the state lands recently secured by Gov. Richards. It is probable that 130,000 acres will be granted in lieu of the school sections in Yellowstone Park.

The Literary Digest, published by Funk & Wagnalls Co., continues to sustain its claims of being "A Weekly Compendium of the Contemporaneous Thoughts of the World," by giving to the readers each week the latest thoughts by great minds in science, religion, literature and art.

"Judge" promises to be just as funny this year as last.

The Semi-Weekly Register-Gazette, of Rockford, Ill., did honor to the Christmas holidays with a colored 4-page supplement that was quite unique, the entire front page consisted of hundreds of children in all kinds of dress—heads, full length figures, with their toys and games. Across the page ran the words "Some of the little friends of the Register-Gazette whose hearts old Santa will gladden." The heads and figures are so close together and there are so many of them, that one gives up trying to count them.

The Tenth Annual Report of the Vermont Agricultural Experiment Station was also received, and is a very comprehensive report of the proceedings of 1896-97.

The holiday number of "Land of Sunshine" contains numerous illustrations of beautiful bits of scenery found in California.

Safety in Buying Seeds.

There is no other way to measure the value of seed than by the value of the crop. A good crop simply can not come from poor seed. Second-rate seeds will waste good land, good fertilizer, and good labor, and the crop won't pay expenses. Now, as the practical farmer cannot afford to waste time testing seeds to find out whether they are true to name, sound and clean, it stands to reason that the only safe way to buy seeds is to seek the protection of a name that has stood for reliability in the past. The great seed house of D. M. Ferry & Co., Detroit, Mich., has sold seeds all over the United States and Canada for the last forty-two years, and the steady growth of the business is a sure

indication that Ferry seeds have given satisfaction. Ferry's Seed Annual for 1898, a standard guide for farmers and gardeners containing much valuable information, is sent free to persons writing for it.

THE HIGHEST HONORS.

The Reliable Incubator & Brooder Co. has received official notice that they have captured the highest award on their incubator and brooder at the Brussels, Belgium, International Exposition. They were honored with the bronze medal and diploma, the greatest distinction that could be conferred. The competition was very sharp, leading incubator makers of Europe as well as America entering the contest. The Reliable was represented by G. Vanvalkensburg, their resident agent at Brussels. Thus is Quincy's reputation as a great manufacturing center becoming world-wide—*Quincy Whig*.

The Abendroth & Root Manufacturing Company supply a good deal of their Spiral Riveted Pipe to the hydraulic gold miners of the West. A recent modification of the laws in regard to hydraulic mining which enables hydraulic mining companies to dispose of their wash without polluting the streams, has caused something of a boom in the industry. An interesting plant has just been installed by the Abendroth & Root Company in the Black Hills. Two large pumps are used to drain a section of the river bed so that it can be worked to bed rock and the gold extracted. The water, in place of being discharged over the coffer-dam into the river again, is pumped through two thousand feet of Spiral Riveted Pipe up the bank to some old gravel beds far above the present river. Here the water is used, through giants, to wash the gold from these banks.

The enterprise promises to be very profitable as there is gold at both ends of the line. The Abendroth & Root Co., will undoubtedly reap the credit their enterprise deserves in being first in the field with a plant of this kind.

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CHICAGO.



CELERY FIELD ON SPRING BROOK FARM, ROSWELL, NEW MEXICO.

THE IRRIGATION AGE.

VOL. XII.

CHICAGO, FEBRUARY, 1898.

NO. 5.

THE PROGRESS OF WESTERN AMERICA.

OUR NEW ADDRESS. Owing to the fact that much of the Irrigation Age mail goes to the office of the former management, thus causing an inconvenient delay, all communications to the journal should be addressed to the Publisher, J. E. Forrest, 916 W. Harrison Street, as in this way only will they receive prompt attention.

Our Frontispiece. Our frontispiece this month represents a large celery field on Spring Brook Farm, Roswell, New Mexico. The photograph from which the cut was taken, was kindly sent us by Mr. W. M. Farmer, of Spring Brook Farm, who makes quite a specialty of celery. Mr. Farmer says the field covers 50 acres. In 1896 he started with a four acre field, which, the following year, was increased to 20 acres, and this year has reached its present extent. Celery raising promises to be one of the important industries of Pecos Valley.

The Good Work Continues. Reservoirs and irrigation works are being pushed vigorously in the western states, and new companies are constantly being formed. John V. Farwell, of Chicago, is at the head of a large company known as the Montezuma Canal Co., which proposes to build the necessary ditches, dams, etc., to irrigate the Southern Ute reservation at Ignacio.

The company will charge \$150,000 for the work of preparing to irrigate 10,000 acres and \$10,000 a year afterward. As reservoir covering fifteen acres will be required to irrigate ten times that amount of

land. The greatest venture of this kind in the State of Colorado is that of the Great Plains Storage Co., in Ontero, Bent and Prowers counties. The Fort Lyon canal receiving its water from the Arkansas river near La Junta, is to have its capacity doubled, the ditch to be sixty feet in width on the bottom, and the reservoirs to cover 13,000 acres. Mr. Searles, the sugar man is backing this company.

Work will be commenced this month in Utah on a mammoth undertaking, which it will require at least a year to complete and give employment to 2,500 men. This is the work on the three great reservoirs and 720 miles of laterals and canals that are to irrigate the table lands in Milliard and Sevier counties of Utah. The state has just signed the contract for this with the Lake Bonneville Water and Power Co. It is claimed that \$2,500,000 will be spent during the next two years for labor alone, and the two canals from the reservoirs will each carry more water than any river in the state. They will be ten feet deep and fifty feet wide at the bottom.

Two canals, one eighteen and the other twenty-two miles long are to be built in San Juan Co., N. M., which will irrigate 94,000 acres of land. California contemplates irrigating the North Fork County by means of a twenty-one mile ditch, and in Mesa County a forty-mile canal is to be constructed.

Wyoming is adding to its system near

Wheatland, two new reservoirs which will add 25,000 acres to the 60,000 acres now under irrigation. The improvements will be completed this year.

**The
Engineers
Meet**

The Montana Society of Engineers held their annual meeting at Butte, Montana, the session closing Jan. 8. Many interesting papers on engineering subjects were read, one by the retiring president, Mr. C. W. Goodale, and others of especial interest were those of T. M. Ripley, regarding the practicability of damming the Missouri river to afford power to Helena and vicinity, and of Mr. Eugene Carroll on the irrigation project. The society elected officers for the coming year and of course had a banquet, this being the proper closing of all meetings. Elsewhere in the AGE will be found a more complete account of the meeting.

**Quite
English
You Know**

Grover Cleveland's private life resembles very much that of an English land owner. He recently purchased 85 acres of wild land, near his home in New Jersey, which he intends to stock with wild game for hunting purposes. He expects to have his game preserve ready by the fall hunting season, to afford sport for himself and guests.

**A Good
Idea**

A committee has been appointed by the International Mining Congress to present a bill to the legislature in February, asking that there be a new department provided for in the cabinet, which shall have charge of the interests of mines and mining. This seems indeed a reasonable request and one that should be granted, for as the congress pointed out at their last convention, "where hundreds of millions of dollars was represented in every branch of the mining industry, it should so interest the state and the government that an independent cabinet officer should look after statistics connected with coal, gold, silver, copper, iron, oil and the other important minerals." It does seem strange that while we have in the cabinet a Secretary of Agriculture and a Secretary of the Navy, the mining industry, one of the most important of our coun-

try, should be neglected. Over \$100,000,000 worth of coal alone was mined in 1896, to say nothing of other minerals. At their last convention the International Mining Congress, which was then known as the Gold Miner's Convention, met at Denver and was attended by almost 1000 delegates, representing every state in the union and nine foreign governments. The meeting this year is to be held at Salt Lake City, Utah, next July, and it is expected that between three and four thousand delegates will be present. W. D. Johnson is chairman of the executive committee of the congress and Irwin Mahon is the secretary of the organization. Both gentlemen are working earnestly to get their bill supported in congress.

**The
Lodge Bill
Passed**

The Lodge immigration bill passed the senate Jan. 18, by a vote of 45 to 28. Two amendments were offered by Spooner, of Wisconsin, and accepted. The bill as passed provides that all immigrants physically capable and over 16 years of age shall be able to read or write the English language, or some other language; but a person not able to read or write, who is over 50 years of age, and is the parent or grandparent of a qualified immigrant over 21 years of age and capable of supporting such a parent or grandparent, may accompany the immigrant, or the parent or grandparent may be sent for and come to join the family of the child or grandchild over 21 years of age qualified under the law; and wife or minor child not able to read or write may accompany or be sent for and come to join the husband or parent who is qualified. The act does not apply to persons coming to the United States from the island of Cuba during the continuance of present disorders there who have heretofore been inhabitants of that island.

**The Passing
of the
Buffalo**

The meeting of Jan. 27th of the National Stock-Growers Convention at Denver, will be a memorable one on account of the barbecue, if for no other reason. This will probably be the last time in America where wild buffa-

lo, bears, elk and antelope will appear on the menu of a barbecue. At the one in Denver there were, in addition to eight beeves, forty sheep and ten pigs, six elk, ten antelope, four bears and—let the darkey smack his lips—400 possum. To accompany the possum was the inevitable sweet potato—forty barrels of them. A half ton of cheese, 3000 loaves of bread, ten barrels of pickles and 400 kegs of beer completed the bill of fare. One is saddened at the thought of the rapidity with which the wild game of America is being exterminated. A western woman, in speaking of this, said that it made her positively angry to see the Eastern sportsmen coming in legions to the West at the opening of the hunting season, where with a hunting outfit that was fearfully and wonderfully made, they proceeded to shoot far more game than they could possibly use. Shooting birds that they had no hope of being able to preserve until they returned home, for the sake of being able to report a great number killed. Such willful waste is indeed sad to contemplate.

On to Klondike.—Despite the discouraging report made by returned Klondikers,

the rush to the gold fields still continues. A Nevada man who went to Klondike early last fall wrote from Dawson City to his wife, telling of the safe arrival of their party, but adding that "if the Lord would let him, he would get out of there at the first opportunity." Everything is overdone, according to him, while from other sources comes the news that the tales of gold have not told half the truth. The first sitting of the supreme court of the Yukon judicial district was held Dec. 9, and the case on trial was for theft. A bag of gold dust and nuggets valued at \$8,634 was stolen from the cabin in which the owners were staying and two men were arrested on suspicion. The evidence was not strong enough to convict them, however. The court was held in a log cabin 17 by 15, and Judge McGuire was attired in a blue shirt and corduroy coat, instead of the customary gown. The Crown pros-

ecutor, Wade, wore a buckskin suit. On the fifth of February the relief expedition, which the United States is sending to the interior of Alaska, started from Portland, Ore., on the steamer *George W. Elder*. Two hundred tons of provisions were forwarded and more is to be sent in the near future. The contract for carrying 150 tons of provisions from Dyea to Dawson City was let to the Snow and Ice Transportation Co., of Chicago, but as the company was not yet in working order, the supplies will be carried by pack train to Lake Lebarge, at which point boats will be built to carry them down the Yukon. The government has bought 500 reindeers from Norway, which are expected to arrive in Alaska in the course of a month and will carry additional supplies. There is urgent need of troops being sent to Alaska to enforce the proposed measures that are to prevent persons unprovided with suitable food and clothing from entering the territory.

The Klondike, Yukon and Copper River Company has been awarded the contract for carrying the mails for four years from Seattle, Wash., to Dyea, Alaska, including Juneau, Sitka and Skagaway. The company is to make five round trips each month and to receive \$15,250 per annum.

Geo. Swineford says, regarding the discomforts to be encountered in the Klondike:—"You can say to anybody who thinks of going to Klondike that they will have a pleasant time if they live to get there. After they have been there three day they will begin to draw comparisons and wonder what kind of a paradise hell is, anyway, compared with that country. The result will be much the same whether they arrive there in the summer or winter. The fact is that the upper Yukon shows the greatest extremes of heat and cold that are shown anywhere in North America. In winter 30 degrees below is mild, the thermometer reading as low as 80, while during the months of June, July and August it gets ambitious and climbs to the top of the tube, ranging from 110

to 130. One can protect himself from cold, but it is impossible to do so against excessive heat, accompanied by the plague of mosquitoes, deer flies and other winged pests." And in spite of this people still go northward.

Leiter's Wheat. When we read that Joseph Leiter has control of the wheat market and that he has 15,000,000 bushels of wheat it does not convey to our minds

any idea of the immensity of these figures. The Chicago Times-Herald, in order to do so, last Sunday gave a picture of the pile of wheat as compared with the Masonic Temple, and estimated that 15,000,000 bushels of wheat would make a pile three times the size of the Masonic Temple, and that Mr. Leiter and his descendants for twenty years could not eat this amount of wheat.



THAT IRRIGATION DITCH.

Written for the AGE.

You may talk about Niagara and your falls of water grand;
You may talk about the little lakes and streams throughout the land;
You may talk about your rivers flowing swiftly to the sea,
But the irrigation ditch is plenty good enough for me.

Niagara Falls will awe you with its beauty and its power;
The little lakes will charm you for many a sunlit hour;
The little streamlets ripple, the rivers gleam and shine.
But when it comes to usefulness, give me this ditch of mine.

Niagara for a bridal tour, the great lakes for a sail;
The ocean for a trip abroad with many a stormy gale;
The river's good for rowing and fishing I'll agree,
But on a farm in time of drought, the ditch will do for me.

L. W.



THE ANTIQUITY OF IRRIGATION.

BY "INDIANA".

There is an old story to the effect that once during a long-continued drought—in Kansas, I think it was—the people met to pray for rain, and one old farmer, fearing that the Lord in answering their petition might construe it to mean any kind of rain, qualified his prayer as follows: "And, oh Lord; don't send the rain slap-dash; but let it come drizzle drozzle, drizzle drozzle, oh Lord, you know how." That was in a section where they did not irrigate and so had to trust to the rain, often getting the "slap-dash" kind that did almost more harm than good.

This "slap dash" method of applying water to the soil was one of the early mistakes of irrigators and was the reason why irrigating was not as successful as it should have been. At the present day farmers have made such progress in this, as in other methods, that they have arrived at practically the best way. And why not? Certainly irrigation has been in existence long enough; for when we begin to study the subject, which has now become so important a factor in the agricultural industry of our country, we are impressed more forcibly than ever with the truth of that threadbare, familiar and altogether obnoxious adage, which is ever hurled at the young enthusiast when he thinks he has discovered a new truth, a new principle, or made an invention never before thought of. While his cheek is still flushed with the first glow of triumph, up rises some hoary-headed sage to assure him of the fact that "There is nothing new under the sun." Notwithstanding the fact that this truth has been quoted so often as to make its pessimistic author turn in his grave, I must again drag it before the unoffending and defenseless reader, as the subject of my remarks.

Solomon, himself, if confronted with an irrigated farm in California, would doubtless have exclaimed, as his mind traveled back some two or three thousand years to the time when the camels of Egypt drew the water that irrigated the land. "There is nothing new under the sun."

Irrigation most certainly is not new. Few farmers stop to think, as they turn a stream of water through the furrows of their fields, that they are but following the practice of the Egyptians—a practice in use two thousand years before the birth of Christ. At that time the Egyptians had extensive systems of canals and artificial lakes for this purpose. In Mesopotamia, China, Persia, India and some other parts of the orient, irrigation was employed thousands and thousands of years ago, and extensive works still exist in such of those as are prosperous at the present day. Certain crops—especially rice—requires so much moisture that the growers early learned that they could not depend upon the un-

certain rainfall, and so turned their attention to the subject with the result that many systems of irrigation came into use, differing to suit the different needs of the crops and soil.

Probably few are aware that India has today the most extensive irrigation system in the world. A year or two ago the official report showed that in the province of Punjab alone there were 3,770 miles of main canal and 5,675 miles of distributing ditches which irrigated about 2,000,000 acres of land. Three of the main canals are over 700 miles long. The crops of one year, from this vast area, almost equaled in value the whole cost of the irrigation system. This wonderful system is under governmental auspices and pays a net profit of $3\frac{1}{2}$ per cent.

It is claimed that the Romans introduced irrigation into Britain about the fifth century, but it was little practiced until modern times. It is in the southern part—in Spain and France—that the system is most used in Europe. The rivers Po, Adige, Tagus and Douro furnish the water that transforms their valleys into fruitful vineyards and valuable farms, which without this aid would be very nearly worthless land. The irrigated land in the valley of the Po is said to be 1,600,000 acres and the increase of rents is estimated at \$4,150,000.

One is amazed, when first interesting himself in this subject, to discover how ancient, how far-reaching and in what general use irrigation is. America, being a country of such natural resources, such abundant rainfall, and a comparatively small number of inhabitants, was somewhat slow to realize the immense value of "watering". True it might fulfill the prophesy of scripture by causing the desert to blossom as the rose, but America was not particularly interested in deserts a few years ago. The gold craze took many people to the West, just as it now takes them to the Klondike, and as population increased in the East and the cities became more and more crowded, the laborer, growing tired of the constant hand to hand fight with poverty, turned with longing eyes to the new "land of promise"—the West. There he hoped to rear his family to a more free and independent life. But rain was wanting in some sections and there were many arid places; so irrigation was introduced into the new world, and as one of the many instances of what can be accomplished by it, take the town of Garden City, Kansas. Eighteen years ago it consisted of a few houses and a "store". In 1880 a ditch was dug for irrigating purposes and then, presto! like the famous beanstalk that grew in a night, the city sprang forward until it justified its name. More ditches were dug and the region around was soon dotted with little villages.

The United States has gone into this enterprise with all the vigor and enthusiasm of youth, and while a few years ago she was a novice in the work, her mammoth reservoirs, and long canals have caused the older nations to open their eyes wide.

Much is still to be learned, both as to construction and laws regarding the use of the water, before the system will be near perfection. Utah

has a very simple and complete system regarding the regulation of the water privileges and other states are endeavoring to make equally good ones. The laws of Wyoming and Colorado are probably the most just and comprehensive of any. In substance they make the following provisions: The public character of all natural water sources; maintains the right of prior appropriation; gives the farmer first claim on unappropriated water; provides that unused water must be returned to the stream, that irrigation works shall have legal right of way; the standard of measurement is to be fixed by law; water districts are to be formed with commissioners to settle disputes and water masters to distribute, appeal to the courts being of course allowed. It is further provided that water appropriations must be registered in the county clerk's office; that there shall be a state engineer and that franchises are to be granted with power to construct works and levy rents.

As to the various methods in use for irrigating—there are and have been, so many different plans that it will take too much space to enumerate them here. It is safe to assert, however, that those who pinned their faith to subterranean irrigation have been forced to confess that it is not the glittering success they anticipated. Like many other things it is better in theory than in practice. For general use probably the best system and the one most approved by practical men, is that of irrigation by furrows. Flooding is good also, especially for crops like alfalfa.

But as my purpose was to give a brief history, or rather synopsis, of the origin, growth and importance of irrigation, I will leave the discussion of the benefits and defects of different methods to some one better fitted to explain them than I am.



A GLIMPSE OF HAWAII.

ENCOURAGEMENT GIVEN TO INVESTORS AND SETTLERS.

We are indebted to the Hawaiian Secretary of the Department of Foreign Affairs for a copy of the Handbook of the Hawaiian Islands, issued under the auspices of the above department. As Hawaii vies at present with Cuba in being one of the chief topics of conversation and public interest, a few things concerning the Island may be appreciated by our readers, and with that supposition we give a short account of the history, climate, etc., the data of which we credit to the Handbook.

In 1778 the islands were discovered by Capt. Cook and their written history dates from that time, though their traditions and oral history, handed down from father to son, antedates that time by several centuries. From the similarity of the people in religion, language, manners as well as in physical and moral characteristics to the inhabitants of the East Indian Archipelago, it has led investigators to believe that the inhabitants of all the groups of Island in the central and eastern Pacific are of the same race—the Polynesian.

An English writer who a few months ago contributed to the Forum an article on the Hawaiian question, made the assertion that the warm, enervating climate of the islands was such as to make it quite impossible for the majority of English or Americans to become acclimated. The Handbook does not take a similar view of this matter, for in the first chapter we read that "They (the islands) are thus on the very edge of the tropics, but their position in mid ocean and the prevalence of the north-east trade wind gives them a climate unequalled by any other portion of the globe—a perpetual summer without an enervating heat. In the Hawaiian Islands Americans and Europeans can and do work in the open air at all seasons of the year, as they cannot in countries lying in the same latitudes elsewhere..... On the Hawaiian Islands he can work and thrive."

There are eight Islands in the Hawaiian group that are of value the others being mere rocks. The eight comprise a territory of 6,740 square miles; Hawaii itself comprising 4,210 of this.

For immigration interest the islands of Hawaii, Maui, Oahu and Kauai hold chief place, for land can be obtained at very reasonable rates and will produce coffee, fruits, potatoes, corn and vegetables. Coffee, after sugar, is the chief product of the islands, and, it is claimed, is of such quality that it can take first place with any in the world. It requires three years for the plants to produce a crop, and it grows best between 500 and 2,600 feet above the sea level, requiring a loose, porous soil.

Experiment has proved that it can be successfully produced in almost any part of the Islands, and in six years fifty plantations took the place of the wild forest.

Government lands are being opened up as fast as possible, and encouragement is given to investors.

To start a coffee plantation the following suggestions are given: Have a good nursery, that is, if you contemplate having a coffee plantation of 75 acres, you will need one acre upon which to start the plants. Some planters obtain the plants for their nursery by taking wild stumps, but the best method is to plant the seed and from that grow your own plants, which, when the proper size, are transplanted to the field. "The next best plan is to use nursery stumps. These are nursery trees that have grown too large to safely transplant. By cutting them down and training the roots they can be safely transplanted to the fields, where



VALLEY SCENE, HAWAII.

they will grow into good healthy trees. Stumps soon after planting send up several shoots; these, with the exception of the strongest one, are taken off. This latter shoot is to grow and make the coffee tree."

The transplanting must be carefully done, the ground kept free from weeds and the trees, after the first year judiciously pruned. The third year the trees begin to bear and continue until the fifth year. The third year the trees are topped, from four and a half to seven feet from the ground for the convenience of the pickers.

The estimated cost of establishing and maintaining a coffee plantation of 75 acres from the first to the seventh year is as follows: The first year for land; 100 acres, \$1,000, houses, buildings, water tanks, etc., \$950; clearing land, fencing it and buying one thousand one-year-old trees, \$2,225; for labor, tools, etc., \$2,780, making a total of \$6,955 for

the first year, The second year's expenses are \$3,080, and the third, \$5,070. The crop that year yields about \$3,600 and from that time on the value of the crop exceeds the expenses, so that with ordinary conditions, and at the previous basis, the end of the seventh year will show a net profit of over \$20,000.

While the farmer is waiting for this coffee plantation to develop he can not only support his family by raising fruits, grain and vegetables, but make a profit by the sale of the surplus. Nearly all the vegetables native to America can be grown here in great profusion, as well as small fruits, such as strawberries, raspberries, etc., while pears and a variety of native peaches may also be grown. The pineapple is one of the fruits indigenous to the islands and there are many native food plants unknown to foreigners. Bananas will thrive on the same soil that will grow coffee, and there is also a kind of tea plant that is native to the country. All these things and many more may be profitably raised, to say nothing of the principal staples, which, as every one knows, are sugar and rice.

With reference to acquiring government lands under the unoccupied land grant, there is this general qualification: "Applicants for land must be over eighteen years of age, must be citizens by birth or naturalization or have received letters of denization or special rights of citizenship, be under no civil disability for any offense, nor delinquent in the payment of taxes." Under the homestead lease system a person duly qualified may obtain a grant of land by paying a fee of \$2 upon application and \$5 when the homestead lease is issued.

In 1890 the census returns showed a population of 90,000, and while the last census is not given it is estimated to be 109,000, of which about one-seventh are Americans and Europeans.

The public debt of the country on Jan. 1, 1896 was \$3,764,335 and the revenue for the preceding year, including taxes, licenses and custom revenues amounted to \$1,740,065.19.

Employments are overstocked and those who have no capital but their trade had best remain at home as many have gone to the islands looking for work only to be disappointed.

The public school system, which is very similar to that of the United States, is unusually good, and is strictly non sectarian. So much so that the amendment to the school laws, passed in 1896, provides that—"No person in holy orders or a minister of religion shall be eligible as a commissioner. Women shall be eligible to be appointed as commissioners; provided, however, that not more than two shall hold commissions at any time."

The first printing in Hawaii, according to Alexander's "Brief History of the Hawaiian people," was done Jan. 7, 1822, it being work on a school book. Missionaries persuaded the king and chief to try to learn to read and write and the king, with the usual forethought of monarchs, "ordered two or three of his more intelligent subjects to try this matter, and see if it were safe, in which case he himself would follow." Finding

the matter entirely harmless, the king and nobles learned to read and write and such progress was made in education on the island that at the end of two years, or in 1824, over two thousand people had mastered the wonderful arts of reading and writing.

Uncivilized nations as a rule are not so eager to acquire education, but regard the art of writing as a species of witchcraft or an evidence of supernatural power. In one of Kipling's stories he tells of an east Indian being sent with a note, the contents of which were that the bearer should receive a certain number of lashes for a crime he had committed. The governor, to whom the order was presented, promptly executed it and sent the poor Indian back with the note. Realizing that the contents of the bit of paper had some connection with the beating from which he still smarted, he determined to put it out of harm's way and fearing the anger of the gods if he destroyed it, he climbed to the top of a very high tree and there placed the magic paper where it would cast no more wierd spells for his undoing.



PINEAPPLE PLANTATION.

But to return to Hawaii and its public schools. Years and years ago children from San Francisco were sent to Honolulu to take advantage of the superior educational facilities of the latter place. This was before Chicago was thought of. In 1840 a law was made providing that wherever "parents having fifteen or more children suitable to attend school live close together," a school should be established. Those who are born on the islands are compelled by law to go to school. The books used are similar to those used in the United States.

One of the "last of the Kamehamehas," the Princess Pauahi, who is now the wife of Hon. C. R. Bishop, of San Francisco, founded the Kamehameha Schools, which are devoted particularly to manual training and industrial education. Owing to the mild climate, the public school

buildings are very unpretentious in character, the chief expense being the teacher's salaries. Private schools are more elaborate and Hawaii has two, which as far as architecture is concerned, are unsurpassed by buildings elsewhere. The fact that, in spite of the mixed population, English is the language taught in all the schools, will do much toward bringing the different races together. The children learn at school and carry the language into their homes, where sooner or later it will be spoken.

Communication between the islands is by steamer and telephone. In short, thanks to the influence of Americans and Europeans, the islands are not half so uncivilized as has been claimed.

According to the Handbook the Hawaiians were never savages, even in ancient times, but barbarians, there being a shade of difference in the meaning of the two words. Their early government was very despotic in its nature, the people being divided into three classes; the nobility consisting of the kings and chiefs; the priests, including also doctors and sorcerers; and the common people, or laboring classes, between whom and the chiefs a wide and impossible barrier existed. The king obtained his right by heredity. Each island had its chief and bitter wars were waged between them. In 1894 there was a cruel civil war to decide who was to inherit the throne, the dead king's son or his brother. And what with the wars and the disease and liquor introduced by foreigners, the common people were so wretched that it was thought they would be completely exterminated.

They had any number of gods and many savage customs among them that of human sacrifice. In 1819 the king Liholilio, Kamehameha II, abolished many of their superstitions, and burned the idols and temples. Great progress was made between the years of 1850-1860.

In 1854 annexation to the United States was strongly agitated by the people and favored by the king. A draft of an annexation treaty was made, but before negotiations between the two countries were completed, the king died and the son who succeeded him was not in favor of it.

The year 1873 saw the end of the Kamehamehas, the last of the line dying without issue. A successor was elected and he, too, died without leaving an heir to the throne. He was William Lunalilo, and was the founder of the home for aged Hawaiians, a beautiful building, a picture of which is given in the booklet. Another king was then chosen, a brother of the noted "Queen Lil," who afterwards succeeded him. Both he and his sister strove to regain the power that the earlier kings had enjoyed and tried by dismissing the ministry to restore absolute monarchy. The failure of their plans is too well known to need mention.

The present republican form of government was formally proclaimed July 4, 1894 and despite hostile influences, not alone from within, has been maintained.

And so we will say in closing that the little booklet has taught us

that Hawaii is not nearly as black as it is painted. The climate is not death to Europeans, the inhabitants are not a lot of blood-thirsty cannibals, and the country is not an arid desert.

We reproduce two of the many beautiful illustrations contained in the book, one being a valley scene, Hawaii, and the other a pineapple plantation.

BIRTHDAY VERSES.

The following dainty little verses are so full of real merit and poetry that we would feel selfish if we did not allow our readers to share them with us. They were written and read by Mrs. —, on the occasion of her little daughter's fifth birthday. The quaint custom of having lighted candles on the birthday cake to represent the years of life, was followed on this occasion, and at the conclusion of each verse a candle was extinguished:

Dimpled hands and dainty feet, sudden laughs and cries,
Sweet "Goo-goo's" and "Da-da-da's" dark and wondering eyes,
Just a little baby girl whom loving arms must hold,
Put the little candle out, baby's one year old.

Now she chatters, every day, learns more words and more;
Can't you hear the little feet pattering on the floor?
Tiny games must now be played, tiny stories told;
Blow the little candle out, baby's two years old.

Here the little brown-bird comes, see how fast she flies!
Hood and coat are all of brown, brown her merry eyes.
Runs about in all the snow, doesn't mind the cold,
Put the little candle out, baby's three years old.

Little skirts grow shorter now, little head grows high;
When she isn't asking "What?" she's always asking "Why?"
Musn't call her "Baby" now, if you do she'll scold:
Put the little candle out, she is four years old.

Little kindergarten girl, merry songs and plays,
Work and love that runs through all, fill her happy days.
Put the little candle out, wish her joy untold,
Cut the cake for Patience now, she is five years old.

RECLAIMING THE LANDS.

REPORT OF THE STATE ARID LAND COMMISSION ON THE WORK NOW IN PROGRESS NEAR BILLINGS, MONT.

The state arid land commission has filed its report with the governor. It is signed by Vice-President Donald Bradford, and goes at length into the possibilities of irrigation as well as the work outlined by the board during the year. The report is as follows:

Your commission respectfully makes report, as required by law, of its work covering the period beginning April 7 and ending Dec. 1, 1897, and in so doing undertakes to give information concerning district No. 1 that may aid materially to develop it. As each district is advanced its advantages will be officially mentioned to enable intending occupants of our lands to come prepared for actual conditions. To this end all reference to other locations is made in the general report herewith.

District No. 1 comprises 10,632 acres of land, with a canal in contemplation, to be constructed by this commission under authority of law. This canal will convey an additional quantity of water, sufficient to supply about 12,000 acres of railroad lands and about 5,000 acres of private lands, aggregating about 28,000 acres.

The general purpose of the Carey act and our resultant state law is to develop dormant lands by building canals and reservoirs, and selling the lands with a water-right at practically the cost of water-ways and incidental expenses attendant. And after completion to operate and maintain them for the settlers at actual cost. With this end intended the work herein described was undertaken with the belief that only the greatest success will result, for the good reason that the fruits of the farm will

to a much lesser degree, take flight as blood money to the profit of the promoter and the distended bond monger. To aid those whom we invite to partake with us of the best gifts from our maker, to partially realize what is offered, we deem it quite essential that that which follows be told.

When a Montanian wishes to impress himself as well as his auditors, with a realizing sense of the immensity of his beloved state he may possibly say: "Just imagine Montana an island in the broad ocean, with inlets and bays, with gulfs, with adjacent isles and splendid harbors; then draw for your mind's eye the picture of a majestic river, our own river, the muddy waters of the mountains, leaving the brine of the sea to wind itself into the heart of nature and the hearts of men; spreading its arms to embrace the hills, and lay at the feet of humanity power to grind and power to dig. Then see before you the veins of gold, silver, copper, lead, of coal; see the great forests and the great plains covered by the flocks and herds; the valleys flecked with homes and hamlets; delicious fruits and melons, every variety of vegetable, of forage and of grain. See the great mountains in staid combat with the clouds; great centers of industry creating comforts and luxuries for the people; then see the ships of commerce conveying to the lands without our surplus of good things, and you will only have a faint conception of the wealth God has placed at our command to enjoy as we will."

And then the Montanian will not have told the half of it. While we have not the sea to lap in rage or love the feet of our

commonwealth, four great railroad systems, the Northern Pacific, Burlington & Missouri River, Great Northern and the Union Pacific railroads furnish transportation to all portions of the state at prices relatively as cheap as other sections of the country possess, and connect us with the great lakes, the two oceans and the gulf of Mexico. And while the distance to any coast, and consequent freight charges largely prohibit the export of our possible surplus products, it should, through proper legislative enactment, serve as a stimulus to a complete home production and supply of our wants. Montana's mining industry creates a demand simply marvelous, which is now almost wholly met by imports from other states, with resulting high prices; hence the settlers who come are guaranteed homes and water supply without intermediate profits to any one, a splendid and unlimited market for properly diversified products of the farm, and a freedom from monopoly, except in transportation (a condition existent everywhere, and that will eventually be corrected.)

As the Montanian has said, the Missouri river extends into and drains all that portion of the state east of the Rocky mountain divide, by numerous forks and branches, and to the principal one of these we desire to call attention at this time.

THE YELLOWSTONE RIVER AND VALLEY.

The Yellowstone river divides with the Snake river of Idaho, and the Madison river the work of draining the famous Yellowstone National Park, the Snake doing duty on the western slope, emptying into Columbia river, the Madison the northwestern portion, and the Yellowstone the northern and largest portion, together with the high snow-capped mountains thereto adjacent. The river, as it leaves the park, travels north for about 50 miles, then turns to the east, which trend it maintains for about 250 miles, when it again turns to the north to join the Missouri river in the northeastern corner of the state. Its total length approximates 400 miles. Into the river, at

intervals, empty streams of more or less magnitude.

The valley of the Yellowstone, therefore, extends in varying widths from the northern boundary of the park to the river's final junction, and includes the lateral valleys appurtenant to the side streams. Its configuration is unique, for it has many levels and assumes a variety of forms. The bottom or level nearest the streams is narrow and of doubtful value for farming; next is a level commonly called a "bench," in the southern arid states "mesa," which at some period was the level next the river; this sometimes measures in width six or seven miles, and in length upwards of 30 miles. These benches alternate in locality on one side and the other of the river, according to the caprice of the floods, and continue its full length. Next are found at different elevations and without regularity basins and flats that harbor lakes fed by melting snows and springs, so that the valley of the Yellowstone is not as valleys are usually understood, but a vast collection of steps and depressions.

Now that a general picture of Montana and the Yellowstone river and valley has been presented, we call attention to the Billings bench. This is one on the level mentioned, second from the Yellowstone river, which extends on one side its full length. This bench (district No. 1) begins about two miles east of the city of Billings, in Yellowstone county, and is 25 miles in length, and about five miles in width. The Northern Pacific and the Burlington railroads center at Billings and parallel the bench, thus giving ample transportation facilities.

CANAL AND WATER SUPPLY.

The canal heads in section 14 of township two south, range 24 east, and is supplied from the Yellowstone river, which flows from 200,000 miner's inches—5,000 cubic feet per second—to 1,400,000 miner's inches—35,000 cubic feet per second. The canal is 20 feet wide on the bottom, with a one to one side slope, and six feet depth of water. The grade per mile is 2.112 feet.

This will supply water at the rate of half of one miner's inch per acre, plus 30 per cent for seepage and evaporation; also for 1,000 horse power gross at the city of Billings. There are no great engineering difficulties to overcome notwithstanding a tunnel 1,800 feet long will be bored through the sand rock bluff immediately north of Billings. Syphons will be used to carry the water under the Northern Pacific railroad; also under Canyon creek, Alkali creek, Five Mile creek, and perhaps one other place. Syphons are much more desirable than surface flumes, as while they are at first more expensive, they are practically everlasting. The soil is of a very satisfactory nature, and will not permit a large percentage of seepage.

LAND AND SOIL.

The Billings bench has a gentle slope towards the Yellowstone river, but so slight it is almost imperceptible; the surface too, is very smooth, which will require little preparation for crops and for irrigation. The soil is a rich loam, loose in texture, with a substratum of gravel, very desirable as a drain to prevent the land becoming waterlogged.

CROPS.

As the elevation above sea level is 3,000 feet, the growing season is comparatively long, insuring three crops of alfalfa, of four tons per acre each season. Vegetables and fruits make luxuriant growth, and are far superior to any to be seen in the eastern states. Melons of all kinds are delicious, and grow to large size, and in great numbers.

MARKETS.

Billings and vicinity is one of the most independent localities to be found anywhere, so far as a market for its products is concerned. For 100 and more miles, north and south, hundreds of thousands of sheep, cattle and horses, feed. As the range has been largely overfed, it has been found necessary to feed a large number of this stock during the winter months. To meet this demand, large tracts of land on

the bench west of Billings have been planted to alfalfa which is fed on the farms under contract, to stock that is driven in for that purpose. The profits derived from this source are large, and no matter to what extent this crop is grown, the demand will grow in an increased ratio, so that the man who secures a farm on the Billings bench with a water supply that is always certain, soil rich and warm and productive, and a market, limited alone by the supply should never want for any of the comforts and many of the luxuries of life.

SALE OF LANDS.

The law provides that where the lands have been segregated, and the cost of all improvements in the district has been fully ascertained, the commission shall "assess upon each 40-acre tract, or fraction thereof the equitable portion it shall bear to the total cost of reclamation of said district, with 20 per cent of such portion added, and none of said lands shall be sold for less than this sum, together with the interest on this amount with the 20 per cent added, at the rate of six per cent per annum from the date of the first bond issued for the reclamation of the land in that district; said commission shall issue to actual settlers certificates of selection at the price so established, which certificates shall contain the conditions of sale of the land, and the use of the water through the water systems for the cultivation of the same," etc.

Under this section of the law, the commission will soon be ready to assess land prices and to issue "certificates of selection" to intending settlers. It is the desire of the commission that all the land be occupied within a short time, so that the settlers may secure labor on the canal, thus to aid them in paying for their holdings, retire the bonds which the commission will receive in payment for lands, and shut off interest charges. It is not now possible to say what the prices of land will be, but they will be low, and terms of sale reasonable.

WATER POWER.

During the months of April to November inclusive (eight out of 12) water can flow in the canal, so the commission contemplates developing about 1,000 horse power by tapping the canal just north of the city of Billings, and convey the water in wooden stave pipe to a point near the railroad for use. This water will be sold at a small price to actual users, and will have a large influence upon the destinies of all the country adjacent to Billings. It will establish a precedent, too, that will bear upon the state generally, as no irrigation or water power monopoly can thrive or eventually exist in competition with a plant owned and operated by the state, at practically cost, and having no watered bond issues, and no stock whatever outstanding.

COAL.

Sixty miles distant, up the Rocky Fork river, are large deposits of the best quality of coal that sells in Billings for \$3.75 per ton, in small lots, and for less in car lots.

FARM SUPPLIES.

Horses of medium or heavy draught can be had at \$40 and upwards.

Milk cows with calves.....	\$ 35 00
3 inch farm wagons.....	75 00
Mower and rake.....	75 00
Self binder.....	150 00
Spring wagon.....	125 00
Harness (heavy).....	40 00
Harness (light).....	25 00

Lumber (rough) per 1,000.....	18 00
Lumber (dressed flooring).....	22 00
Farm labor, per month.....	25 00
Flour, best per 100 lbs.....	3 00
Breakfast bacon, per 100 lbs.....	12 00
Fence posts, cedar each.....	10
Fence wire, per lb.....	03

Legal fence has posts 20 feet apart with not less than four wires, the lowest 18 inches from the ground, all of them equidistant, the top 4½ feet high, with tin tags on the upper wire to serve as notice to stock.

SCHOOLS.

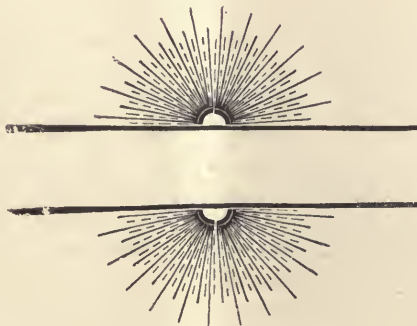
In the city of Billings are grade schools of the best class, also a high school. In the upper Billings valley schools are numerous, and as necessity requires, new districts are established, and competent teachers supplied.

CHURCHES AND SECRET SOCIETIES.

The more prominent religious denominations have church edifices in Billings and are well attended and prosperous. So, too, there are many benevolent organizations that display their zeal in the relief of sorrow and misfortune.

FLOURING MILLS.

There are two flouring mills in Billings that manufacture into flour all of the wheat raised in that region, and are at present paying \$1.20 per 100 pounds for wheat delivered in the city of Billings. Correspondence solicited.



THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs. Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

THE FARMER.

Years ago the son who had, apparently, no talent in any direction, was at once destined by his fond parents for the ministry, "John doesn't seem to be good for anything," they reasoned, "therefore let us make a preacher of him." Which they did, if we are to judge from the number of second-rate ministers. A great many people have this same mistaken idea in regard to farm life. It is a popular superstition—for it really has so little foundation that it may be designated as such—that any man can become a farmer. A man fails year after year in every kind of business venture that he undertakes; he has devoted several years to learning a trade, yet either through incompetence, indolence or bad management, he has failed to make anything but a very bare existence. At this stage he decides to become a farmer. He has made a failure of everything else, therefore he is quite competent to run a farm.

An easy-going man, who for years had lived a hand to mouth existence in the city, who through his own idleness and folly had failed to grasp the opportunities fortune had placed in his reach, decided that, after all, the only life was that of the farmer. "What an independent existence it is," he would say. But the chief charm in farm life to him was the fact that as he expressed it, "Your crops grow while you sleep." His idea was that in the spring

you did your work in planting the crop and after that you rested from your labor, trusting to Providence to do the rest, until harvest time, when a slight effort on your part was again necessary.

This is a very erroneous idea. To make a successful farmer one must have not only energy and the willingness to work, but must also possess a practical knowledge of agriculture. While farming is not a "trade" in the common acceptance of the term, it is an occupation that requires experience and study to attain success.

The successful farmer is posted on the up-to-date methods; he knows the value of fertilizing and irrigation; he reads the literature that deals with the care of the live stock; he keeps up with the times in regard to farm implements and machinery, and in short, knows as much in regard to farming as the mechanic does about his trade. In addition to this he must be a hustler. He cannot plant his crops in the spring and then go into a trance, leaving the crops and the weeds to fight it out alone, with any certainty of the crop coming out ahead. No, a farmer has to work as hard for his livelihood as any city laborer, and an idle, shiftless, ne'er-do-well is as useless in the country as he is in the city.

HOGS.

There are 40,600,276 hogs in this coun-

try, not counting the human variety, and they are worth \$106,272,770, an average of \$4.10 per head. Iowa is the banner hog state, with 3,737,970, and an average value of \$5.67. Missouri is second with 3,074,429, and Texas is third, with 2,944,063. The state with the least number of hogs in it is Nevada, with 11,126, an average of one hog to every four persons in the state. New York has 632,524 hogs of an average value of \$6.61. The highest priced hog is found in Connecticut, where his average value is \$9.29 and the state carries in stock 53,737 head of this elegant specimen. The Connecticut hog owes his value to his diet of wooden nutmegs. Ohio is well to the front with 2,284,662, and Rhode Island bristles all over with 14,280, of an average value of \$7. Illinois, in which state Chicago is located, has 2,240,461. The lowest priced hog is a native of Florida, and his average is but \$2.02. He is the famous razor back, and he can root up the fifth row of corn through the cracks in the fence.—Ex.

HOW TO IRRIGATE A GARDEN.

"After many seasons of experimenting I am convinced that the single furrow system is the best and most perfect plan for irrigating the garden," says Joel Shoemaker. "The seed must have moisture at the proper time to thoroughly germinate and there is but one way to supply this demand, by conducting the water to the proper place. I have tried beds and squares with the water flowing over, around and under by seepage and the seeds require from one week to three months to germinate. In some of my beds having irrigating furrows on either side with seed filling the space of two feet between many plants have seeded while other vegetables were just coming above ground.

The most successful plan I have adopted is to mark out the furrows with a hand plow, about twelve inches apart, and plant with the seeder on the ridges between the ditches. If the water is seen

through the furrows before using the seeder the plants will come quicker and more uniform and the machine will not fill the marks for irrigation. When the plants are large enough to be irrigated the water courses along on either side at the roots where moisture is needed and a uniform growth is obtained. The furrows should not have any obstructions such as clods or weeds to prevent the water from passing through as quickly as possible. If the soil is loose and in good condition no ditch should have water in it more than one hour at a time, or the plants will suffer from over irrigation.

Cultivation is of course necessary after each irrigation and should be given as soon as the surface is dry enough to stir. The best results from plowing are obtained immediately following the application of water instead of just before as is generally supposed. I use the cultivator teeth freely on small plants and the plows when vegetables are large enough to admit of hilling. The deeper the irrigating furrows are cut the better the plants will grow. If plants become stunted and apparently worthless from flooding, seepage or percolating too much surface water, the single ditch system, cut deep enough to drain the water away will effect a cure and insure a crop."

WORTH QUOTING.

Mr. John G. Hall, Superintendent of Irrigation at Edgemont, S. D., wrote the following for the Edgemont Express, Fall River Co., S. D., which we think will be of interest to our readers:

SELECTION OF FARM SEEDS.

This season of the year the farmers should study out the peculiarities of his different fields and satisfy himself what products are best adapted to the different soils of his farm. For instance, we select the sandy soil for potatoes, vegetables and root crops, the heavy for wheat, oats, corn or any product that makes its growth above the ground. Care must be taken to prepare the soil in the best manner for

best results, but even when this is done it is not all that is required to secure a good yield, as the most essential of all for a good result is the planting of nothing but seed that has the vitality to germinate and send forth a good healthy vigorous sprout. In potatoes the first sign of inferiority is the eyes growing deep followed by growing small at one end, when any of these signs are visible they should be discarded for seed purpose as good results can not be obtained from such seed, and however good the culture may be, seed potatoes should always be hand picked before planting time. Take your pile of potatoes that your seed is to be selected from and select, say one dozen specimens of medium size, true to name and characteristic in shape to the true variety, then select the balance of your seed as near like the samples as it is possible to do. It is not policy to select seed potatoes from a pile that sorts away one-third or one-half. The larger the seed that is planted the smaller will be the per cent of small ones grown.

The same care should be exercised in the selection of all other seeds. Wheat with a large berry usually yields the best in a new country. Where farming is done with a limited means, experimenting with untried varieties should not be indulged in as it is too costly, but varieties that have been tried for years and proven a success, such as the Australian and defiance varieties should be secured. The cost of securing good seed should never be taken into consideration compared with the benefits derived between having good seed and poor, as it is only a waste of time and money to prepare ground to plant poor seed.

"In an irrigated country small grain does best on a hard surface. Spring plowing is too porous and loose for best returns, when potatoes or corn have been grown the season before and prepared for the small grain with spring tooth harrow or something similar, that does not stir the ground too deep is better.

"The best ground for small grain is where a crop of clover or alfalfa has been

turned under, ground planted the first year to potatoes, second year to small grain. From 40 to 60 bushels of wheat or from 50 to 100 bushels of oats can be harvested off ground of this kind under favorable conditions and with good seed.

JOHN G. HALL.

AMOUNT OF LAND.

The Orange Judd Farmer is advocating the building up of a larger export trade in corn through government aid, the money now wasted in seed distribution to be devoted to the corn trade. In support of its agitation it asserts that Japan enlarged its tea trade by government aid and forced China and India to do the same. The cane sugar industry of Europe was developed by a bounty system and Denmark captured the English butter market by government assistance, while Australia has forced it meats and other products into the English market in much the same way.

LEVEL ROOSTS.

In three-quarters of the poultry houses of the country the perches are arranged like a flight of stairs, rising from the front to the rear. Why this arrangement was first used would be pretty hard to tell unless it was because it was handier to lay two scantlings against a wall and lay the perches in notches cut into them.

When the perches are arranged in this staircase fashion, the hens invariably quarrel for the top perch, as it is their nature to roost as high as they can get. This quarreling leads to bruises and other injuries and should be prevented by having the perches all at the same level.

The distance from the floor should depend in some measure on the kind of hens kept. If they are of the heavy breeds 18 inches is high enough, and 30 inches is high enough for the lighter breeds. If a tight platform of boards is placed under the perches it will catch the droppings and save the floor space clean for scatching room in bad weather. The platform should be just far enough below the

perches to allow a common hoe to be introduced to scrape the droppings out. Sprinkle the platform with dust or coal ashes every day, and the poultry house will never become foul with bad odors if it is cleaned out two or three times a week.

—Florida Farmer and Fruit Grower.

BEE-STINGS FOR RHEUMATISM.

Reports as to the effect of bee-stings on rheumatism continue to conflict, some reporting success, others failure. E. W. Moore says his mother, 62 years old, had for years lost the use of her left hand through rheumatism. Last summer, hiving a swarm alone, her hand was badly stung and swelled greatly, but when the swelling went down the joints were no longer stiff, and now she can use the hand as well as ever.—Progressive Bee-Keeper.

A Buffalo farmer made a discovery last summer in regard to toads, that shook his faith in the use of that animal. He often noticed in the evening a large toad sitting before the beehive, but was careful not to molest it, as it was such a good destroyer of troublesome insects. One evening he watched the toad for a short time and found to his surprise that as a bee alighted loaded with honey, at the entrance of the hive, the toad darted out his tongue and captured the bee. Upon dissection, the stomach of the toad was found to be full of bees in various stages of digestion, and in all probability it had devoured 40 or 50 bees per day. One would think the sting of the bee would protect it from such a fate.

F. J. Berry, of the Dexter Horse Exchange, Chicago, is one of the many horsemen who predict a scarcity of horses in the near future. In a speech made at the National Stock Breeders' meeting at St. Paul, he said that owing to the poor methods of the past few years, which have driven so many breeders out of business, we might expect a horse famine in this country.

If the water flows in the ditch now is the best time of the entire year to irrigate a young orchard. It is now conceded by all experienced horticulturists in arid America that more young trees are killed by winter drouth than summer heat, and we now believe fully in the efficacy of a good wetting in midwinter in order to circumvent as far as possible the damaging results of the peculiar drying out process which is so apt to shrivel our young stock between now and early spring.

This is a good time to dynamite ground upon which to set fruit trees and where it is on virgin land with tenacious hard pan it will surely pay, as it does not exceed 5 cents a charge. Drive the holes with a steel rod and maul. Make the holes from three to four feet deep and charge with a third of a stick of giant. If unacquainted with the explosive and method of handling it, get some one who knows all about it to do the initial work and give instructions. After the blast, take a long-handled shovel and throw out the mass of earth in the hole caused by the explosion. If the holes can be irrigated at once with as much water as they can hold so much the better. Set the trees at the usual time in the spring.—Mosca (Col.) Herald.

The government is conducting experiments in regard to different varieties of grass. A large "grass garden" is maintained at Knoxville, Tenn., where under the careful eye of a competent director, experiments in regard to the use and growth of grass and forage plants are being tried.

A farmer of Red Lake township, South Dakota, makes the following report for the past season. On 90 acres of land he raised 1,500 bushels of wheat and 2,400 bushels of corn on 80 acres. From Jan. 1, 1897, to Jan. 8, 1898, the sale of corn was 2,500 bushels, for which he received over \$500. He has sold a small part of his wheat for 70 cents a bushel. A good report for South Dakota as well as for the farmer.

PULSE OF THE IRRIGATION INDUSTRY.

IRRIGATION WITHOUT THE CANAL.

Upon the subject of irrigation a Nebraska correspondent in the O. J. Farmer says: Insurance against drouth is so cheap and so practical that it is a wonder it has not been more generally practiced in the central west, as well as in the middle and eastern states. Plan to utilize all the water which comes within your reach. By selecting the lowest spot on the farm and preparing a pond to which ditches may lead a supply of water can be secured, and at the proper season carried outside of the pond by wind power to irrigate adjacent land. I have such a pond, which, with the ditches, was prepared at a comparatively small expense. I secured an old pattern Moore road grader, to which I hitched eight horses, four abreast. The ditches were made with one round of the machine. Make the pond circular, leaving an island in the center. With the grader I began plowing in a circle 20 rods in circumference, gradually working outward until the outside measurement was 50 rods. Then setting the grader so it would throw the earth outward, I began working toward the center until all the loose dirt was removed. I then had a smooth surface upon which to begin plowing as before. Continue until the pond is of the required depth. When completed the bottom must be treated as follows, so that it will hold water: Put in one inch of fine manure and over it spread three inches of black gumbo soil. Wet this and puddle by dragging a two-inch board over it. Similar ponds may be prepared, and afterward filled by means of wind-mills.

On farms which have no basins the water may be taken from draws or canons previously dammed and prepared for hold-

ing the supply. The water will then have to be raised by windpumps and carried in cheap board troughs to the land to be irrigated. The same power which carries the water out of the pond might be utilized to fill the pond from a well. In addition to the benefits mentioned, this system drains the land, increases the rainfall of a country, and if the ponds are deep enough makes it possible to raise fish.

MONTANA SOCIETY OF ENGINEERS.

The Anaconda Standard contains a lengthy account of the 11th annual meeting of the Montana Society of Engineers, held at Butte, Jan. 6, 7 and 8, and gives the papers read. "The Anaconda Water Works" was the subject of one paper. The Anaconda Copper Mining Co. has acquired and located rights to all the water in Hearst gulch. The water comes from Hearst Lake. The company intend raising the banks of this lake and will give it a capacity of 70,000,000 gallons, and this will furnish Anaconda with water. The following is from Mr. Eugene Carroll's paper on Irrigation Project:

"In the fall of 1895 the Butte City Water company diverted the head waters of Fish creek across the Continental Divide to increase their water supply in Butte City. As this necessitated taking considerable water from one valley and turning it into another so that the water did not return to the stream from which it was taken, it required the purchase by the company of a large number of ranches which were located along Fish creek between the mountains and its mouth. In this way the company acquired the title to about 3,000 acres of cultivated land. There was sufficient water left in Fish creek after taking out the water from its head to take care of

most of the ranches, but in order to make those at the lower end of the creek saleable, and furnish them with an ample supply of water for irrigating purposes, the company in 1897 decided to construct an irrigating ditch, taking its water from Jefferson river, and extending the ditch past their ranches on lower Fish creek. In doing this they have permitted ranchmen along the line of the ditch to join with them, and a ditch company is to be formed known as the Creeklyn Irrigation company.

"The company is stocked in such a manner that each share of stock represents 25 inches of water. The headgate of the ditch is placed on the Jefferson river about 2,000 yards above the Iron Rod bridge, and winds on a grade of 26-10 feet per mile for 13 miles, emptying into Fish creek. The ditch is designed to carry in solid ground 1,000 inches of water, a liberal allowance being made for evaporation and seepage. The excavated earth from the ditch forms an embankment on the lower side of the ditch, which will be carefully built, and which, in the course of a few years, will more than double the capacity of the ditch. There are no peculiar features about the construction of this ditch. It is necessary to go through the town of Silver Star, which is done by placing a covered flume along the main street of that town. The total length of the ditch is about 13 miles, and there are about 40,000 feet of lumber required for bridges and flumes. The contracts are let and the first mile of the ditch is about completed.

The contractors have until the 15th of June in which to complete the work. The head-gate is built of lumber supported by concrete masonry and is 12 feet wide. The bottom of the head-gate is placed at two feet below the bottom of the river at the point of diversion."

The officers elected by the society for the coming year, according to the Butte Miner are: President, J. M. Page, Twin Bridges; M. S. Parker, Great Falls, vice president; F. J. Smith, Helena, second vice president;

Albert Hovey, Helena, secretary and librarian; James S. Keerl, Helena, treasurer and trustee for the national association, of which the state society is only a member, E. R. McNeil was elected trustee.

The meeting was well attended, excursions being run Jan. 6 and 7, and apparently well enjoyed.

PRACTICAL IRRIGATION; THE RESERVOIR.

Under the above heading J. W. Stubenranch, of Mexia, Texas, writes in the Texas Farm and Ranch, as follows:—Next to a good soil, sunshine and rain in proper proportions are indispensable in attaining the best results on either the farm, orchard or garden. The good soil we have in plenty in Texas, and those who have not can easily make it so. Of sunshine—well, is there a person living who thinks that we have not enough of it? It is only a sufficiency of moisture at the proper time that is lacking, and which prevents us at some seasons from growing the most enormous crops year after year that the world ever has seen. Our mean average rain-fall per annum over Central Texas of over 40 inches is more than ample for growing the biggest crops. Unfortunately, however, like in all southern countries, the distribution of the rain is very unequal. Drouths, often so disastrous, are nearly always preceded by floods. To save this surplus rain and storm water, during a wet spell in a big storage tank is the first requisite on most of our farms to a beginning of a successful, economical system of irrigation. The water once safely stored, a higher piece of ground from which water will run in different directions, is often found close by. If a reservoir is built at this high point, a wind-mill is put up anywhere along the storage tank, which will pump up the water into the reservoir, a very effective mode of irrigation is made possible. The writer is following this plan exactly. The 12-foot I. H. L. wind-mill operates the 5x20 inch cylinder pump, and the pump fills the reservoir from the storage tank 600 feet dis-

tant. The reservoir is 75 yards long by 70 wide, or 350 square yards, over an acre. Its average depth is a little over 7 feet. Have through dam two outlet pipes, or gates, through which water is carried in elevated ditches along and past the rows of trees or plants to be watered. The soil being a fine sandy loam with a red clay foundation, in order to prevent wastage of water along the ditches, I have found it necessary to first plow out deep, right and left, thus making a ditch below the level where it is to be above it. This ditch is then filled up with mud out of the bottom of the storage tank, so as when completed it will be fully 6 inches higher than the land on each side to be watered. Bringing water over this tank mud will run it together and make it as hard as cement, so as to be practically no loss if water is to be carried along any distance. This is very important, since, when water is carried over what may be called sandy knolls, a large portion will seep through the porous soil, and instead of doing good further on will only do harm by wetting too much where it is. The dirt out of which the reservoir dam is built is taken out of the center, giving a good depth for fish, below the outlet pipe in the dam. The job of building it was a good sized one, yet, taking all together it did not require over two months for one man, a good team, a steel beam, plow and a wheeled scraper to do it. Had I been obliged to use only the ordinary steel drag scrapers, the job would have been more than twice as big.

The suction pipe used is of 3-inch piping, and the discharge pump, coming direct from pump on up over dam of reservoir, is 2½ inch. In a good wind the mill will pump all the water that the 2½ inch pipe will carry off under pressure from a large air chamber.

Buying at inside figures for cash, the cost of mill, pump, piping and all necessary fixtures put in position ready to start, did not much exceed \$250, there being over 600 feet of piping. Figuring all labor of building tank, reservoir, and what it will

yet require to fill up ditches, etc., read for use at a fair value, will be about \$250 more. Being able to irrigate from this plant fully 30 acres, the cost for acre of putting the water on will come to about \$17.00; actual cash outlay only \$8.50.

The intention is to always fill the reservoir in the spring of the year, when there is both an abundance of wind and usually also water. A drouth after this will no longer have any terrors for us, should it come, and when did we last have a season when there was no drouth? It appears that the coming successful man will not only need a hoe, but will also need his water hole handy from which to draw in time of need.

MORE WATER.

Aid has been asked of the government to assist in carrying on the proposed irrigation enterprises in the West, and Capt. Hiram Chittenden, of the corps of engineers, U. S. A., was sent by Congress to make investigations concerning the matter. If the plan proposed is carried out millions of dollars will be spent, and lands in seventeen states and territories will be benefitted. The senators and congressmen from almost every state west of the Mississippi will unite in asking that the government give aid to these enterprises, claiming that as between the state and nation the work falls more properly upon the latter.

Capt. Chittenden examined fire reservoir systems—three in Wyoming and two in Colorado—and sums up his observations on the sites as follows:

"Laramie site, near the town of Laramie, Wyo., for storing the waters of the Laramie and Little Laramie rivers and possibly of the North Platte and other streams. Available supply from the two Laramies, 46,000 acre feet; estimated cost for storing waters from the two Laramies, \$416,254.14; cost per acre foot, \$70.05; water now needed; cost of bringing North Platte into basin, possibly as much as \$1,000,000; supply would add

328,000 acre feet to storage of reservoirs and reduce the cost per acre foot to \$3.43.

"Sweet water Site—Capacity, 326,965 acre feet; cost, 276,484.80; cost per acre foot, 85 cents; storage not yet urgently needed; probable annual storage when the stream is fully utilized will be 1,000,000 acre feet; cost per acre foot on this basis, \$2.76.

"The Piny creek system consists of three sites: Cloud peak site, near the source of the stream, capacity, 6,800 acre feet; cost \$31,048; cost per acre foot, \$4.56. Piny site, capacity 11,040 acre feet; cost \$70,346; cost per acre foot, \$6.37. Lake Desmet site, capacity 67,678 acre feet; cost, \$113,360; cost per acre foot, \$1.67.

"In case the national government should undertake the work of reservoir construction in the West," he says, "the Piny system would be recommended for first consideration in Wyoming. The water is now urgently needed and construction should proceed in the following order: Piny site first, Cloud peak second, and Lake Desmet last. The work should cover three years, and the first appropriation should be \$100,000."

Of the two sites examined in Colorado, the report says:

"The South Platte in Colorado, capacity 41,320 acre feet, cost \$540,000; cost per acre foot, \$13.07. This site should receive first consideration of the two examined in Colorado. The water is urgently needed. Construction should take three years, and the first appropriation should be \$200,000.

"The Lowland site for storing waters from the Big Thompson and Cache La Poudre rivers, capacity 45,741 acre feet; cost \$262,106.34; cost per acre foot, \$5.73; storage now needed. Complications with existing water rights render the project for government construction one of doubtful advisability."

Quoting further from the Captain's report, he says regarding the reservoirs as flood regulators:

"A general system of reservoirs in the arid regions sufficient to contain the flow of the streams over what is possible to draw from them directly in irrigation would, it is believed, cause some reduction in the flood height of the Missouri river during the June rise. The amount of this reduction would, of course, depend upon the distance of the section of the river considered from the point of storage, and would diminish rapidly with an increase of this distance.

"Reservoir construction in the arid regions of the West is an indispensable condition to the highest development of the section. It can be carried out only through public agencies. Private enterprise can never accomplish the work successfully."

He claims that the government should own and construct these reservoirs, but that irrigation works should be left in the hands of states and private corporations. To give some idea of the magnitude of the enterprise that is advised, we give the following estimates, that are the result of the recent investigation:

"The total extent of a reservoir system in the arid regions which shall render available the entire flow of the streams will not exceed 1,161,600,000,000 cubic feet. If the construction of such a system were to consume a century in time it would represent an annual storage of about 11,600,000,000 cubic feet, or 266,800 acre feet. At \$5.37 per acre foot this would cost \$1,432,716 per annum. This amount distributed among the seventeen states and territories of the arid section, gives an average annual expenditure in each of \$84,277. The annual value of the stored water would return the original cost and maintenance in an average period of three years."

This is one of the most vast and far-reaching plans yet advanced for reclaiming the arid West.

A western paper emphatically denies the report that Crazy Woman creek in Wyoming, was named after Mary Ellen Lease,

STATE NEWS.

ARIZONA.

Like many other states Arizona had her share of snow during January. The latter part of the month there was ten inches of snow in the Tonto basin; this means plenty of water for irrigating purposes.

On January 13 much loss of life and property was caused by a tornado that swept over a portion of the state. Forty-three persons met death at Fort Smith and vicinity, while 300 others were injured more less seriously.

A fire occurred recently in the Sante Fe tunnel, seven miles west of Williams, and two men died from injuries received. A force of 700 men were employed for almost a week clearing away the ruins and a deep cut is to be made to take the place of the tunnel.

An event occurred at a Prescott saloon that caused quite a sensation among the crowd gathered there. A veiled woman walked in one evening and laid a baby on the bar before the amazed bar-tender. A note pinned to its clothing explained that the baby's mother was dying and that as its father had spent the money that should support the child in drink at the saloon, it was thought the proper place to leave the baby. About forty men were anxious to take the pretty stranger, but the probate judge finally captured the prize and assured the unsuccessful men that he would invest the \$300 he won in the "game" that evening for the child's benefit. This story is worthy of Indiana or Kentucky.

According to an Arizon exchange "The governor of Kentucky sent his message to the newspapers and then forgot to send it to the legislature. That governor could be elected senator in Arizona."

CALIFORNIA.

A disastrous fire occurred on the 19th of January at the mining camp of Randsburg. Thirty buildings in the business part of

the town were destroyed, among them the post office. The loss is conservatively estimated at \$50,000, with no insurance whatever.

The California Advocate, published, at San Francisco and Escondido, begun the New Year by becoming a weekly instead of a monthly.

The Covina Argus very truthfully says: "The Kentucky woman who wants to be nominated for president by the Prohibitionists should first take the precaution to establish a residence in some other state.

At the annual meeting of the stockholders of the Azusa Water Development and Irrigation Company, at Covina, January 11, it was decided to make the same rates for uses of water in Covina as in Azusa, that is \$2.50 for a run of 100 inches for twelve hours and at the close of the year the users will be assessed to make up a deficit, if any there be.

The second week in December Riverside shipped 165 cars of oranges, or 47,762 boxes.

COLORADO.

The many friends of ex-Senator Tabor, the one-time mining king who invested so much money to build up the city of Denver, will be pleased to hear that he has been appointed postmaster. He is in straightened circumstances and the appointment will be very acceptable.

A western paper says:—"Ten days ago fourteen of the big department stores of Denver, controlling nearly 50 per cent of the advertising support of the Denver papers, ordered their advertisements out unless a 30 per cent reduction in rates were made them. The managers of the newspapers decided that if they could be arbitrarily dealt with in that way in a matter of business, eventually the department combine, feeling its power, would dictate the editorial utterances and hold a censorship over the press that would make the columns of those papers nothing more than a reflex of "business methods." This

high-handed course aroused the people of Denver and their indignation found expression in a refusal to patronize the department stores. So threatening did the boycott become that Tuesday the combine made an unconditional surrender to the newspapers, with the result that hereafter the department stores will be made to pay a higher scale of rates than was in force prior to the trouble. This is a great victory for the Denver papers."

Rio Blanco county has won distinction through the fact of its having had no poor to care for during the year 1897. This is a very enviable record. No money was expended for the care of paupers that year, and Rio Blanco isn't a little two by four county with a population of ten people, either, but one of the largest and most prosperous counties in the state. In 1890 The census gave a population of 1,200. Meeker is the county seat and principal town.

The value of the alfalfa crop to Colorado is reported to be \$10,000,000 a year.

NEBRASKA.

On Jan. 20 a portion of the floor of the Cudahy Packing Company, at Omaha, fell, injuring several men and killing one. The walls supporting the floor had been weakened by repairs.

WASHINGTON.

E. D. Olmstead, mayor of Spokane, gave permission to the Chinese of that city to celebrate their New Years day from Jan. 20 to Feb. 4 inclusive, with all the noise and fire works they care for. So for ten days the heart of the Celestial will be made glad by the tom-tom of musical instruments, the smell of gun powder and the popping of fire crackers. In short there will be a hot time in the old town" not only one night but several.

Pomeroy is shipping about fifteen car-loads of wheat daily.

One hundred and eighty-five out of the 207 shingle mills in the state have been

closed for some time and will make no output until after Feb. 1.

KANSAS.

The corn and wheat crop of Kansas for the past year was valued at the enormous sum of \$132,250,000.

INDIANA.

The last week in January the farmers of La Porte county met at La Porte, the county seat, and held their annual "institute." The all-important sugar beet came in for a large share of the discussion. The meeting was very successful.

A Utah milling company has a contract to ship 30,000 pounds of flour to China every month for a year.

ONLY ONE HONEST MAN.

A story was recently told of how a preacher tested the effect of the hard times upon his congregation. At the conclusion of one of his sermons he said: "Let everybody in the house who pays his debts stand up." Instantly every man, woman and child, with one exception rose to their feet. He seated the crowd and then said: "Let every man who is not paying his debts stand up." The exception noted, a careworn, hungry individual, clothed in his last suit, rose in front of him. "How is it, my friend, inquired the minister, "that you are the only man in this large congregation who is unable to meet his obligations?"

"I publish a newspaper," he meekly replied, "and my brethren here who have just stood up, are all my subscribers, and—

"Let us pray!" exclaimed the minister. —Ex.

In Dawson City, we are told, men think nothing of spending \$1,000 a day for "fun." How much fun can they get there for that much money?

WINES AND MINING.

WYOMING.

The Surprise Copper company has completed over 100 feet of its 500-foot tunnel on its copper property at Hazenville. The wall rock has been reached. Copper float is being found at the present time. The work is being prosecuted day and night.

Wyoming is certainly coming to the front as a mineral state. The Copper Top mine is one of the claims purchased by the Charter Oak Company, and it is claimed that recently gold was panned from rock taken out of Copper Top that would run up to \$700 per ton. While the gold and copper fields in the upper part of the Saratoga valley, known as the Grand encampment, are creating wonderful excitement among the citizens of Cheyenne and vicinity. In speaking of the state an Eastern man writes as follows:

"Easterners are becoming deeply interested in Wyoming. Every day they read of your gold, copper and iron camps, irrigated lands, etc., and many like myself have determined to visit Wyoming and endeavor to get a proper estimate of your resources. Being as you are the neighbor to Colorado, one of the best gold states, it does not seem at all strange that you should develop some rich mines: I am now aware, by personal investigation, that you have some promising oil lands and unsurpassed soda lakes. I have seen samples of ore, also, that indicate that Wyoming will soon be numbered with the great producers of gold and copper."—*Cheyenne Daily Sun-Leader*.

St. Petersburg, Russia, Jan. 18.—Forty persons were killed and 18 injured by an explosion of gas in one of the mines of the Donetzor company in the Tagenrog district, on the north shore of the Sea of Azov.

An accident recently occurred in the Trade Dollar mine at Silver City, Idaho, which it is claimed is the most peculiar

mine accident ever known. In a three compartment chute, one side was for waste, one for ore and the middle one was the manway. The waste chute was empty and the ore chute was blocked. When the shift boss succeeded in loosening the ore, the concussion of the air blew out the center plate of the ore chute and blew in the center plate of the waste chute.

Every vessel in the English fleet at Exquimault, B. C., was ordered to go to China the 20th of January, and preparations were at once made for the voyage.

Six wells having good streams of petroleum are now flowing in the oil district of Fresno county, California, and more wells are being bored. Several car loads of the crude oil are shipped daily.

In Yuma county, Arizona, opposite San Diego county, on the Colorado river, the Gold Extraction company shows \$68 per ton value based on 51 samples of ore. The product is valued at \$1,017 per day.

Two mines in the Virginia Dale district, took out \$300 in two weeks with a dry washer.

Those who have been to the gold fields of Bolivia, S. A. say that it is no country for a poor man to go with the expectation of making anything at mining. Food is cheap and plentiful, but very expensive and heavy machinery is necessary to carry on the placer mining.

Oil from the oil fields of Summerland, Santa Barbara county, Cal., can be shipped from there to San Francisco by water for 14 cents per barrel, while the freight by railroad is 51 cents per barrel.

There was a wedding recently in Missouri the groom of which was 100 years old and the bride 77. It is such youthful unions that threaten the supremacy of the race and emphasize the contention that we allow our boys and girls too much freedom.—Ex.

ODDS AND ENDS.

AS OTHERS SEE US.

While Christian people are prone to tell what they think about the heathen, we very seldom have a chance to know what the heathen think about us. We are given this opportunity in an extract that appears in a recent number of the Literary Digest, translated from the Frankfurter Zeitung, giving the opinions of a Chinaman who lives near Shanghai. We are sorry not to be able to quote the entire extract.

"We are always told that the countries of the foreign devils are grand and rich, but that can not be true, else what do they all come here for? It is here that they grow rich. But you can not civilize them; they are beyond redemption. They will live weeks and months without touching a mouthful of rice, but they eat the flesh of bullocks and sheep in enormous quantities. They eat with knives and prongs; it makes a civilized being perfectly nervous. One fancies himself in the presence of sword-swallowers. The opium poison, which they brought us, they do not use themselves. But they take enormous quantities of *weskichu* and *shang-ping-chu* [whiskey and champagne.] The latter is very good. They know what is good, the rascals. It is because they eat and drink so much that they never rest. A sensible civilized person does nothing without due consideration; but the barbarians hurry with everything. They certainly do not know how to amuse themselves. You never see them enjoy themselves by sitting quietly upon their ancestor's grave. They jump around and kick balls as if they were paid to do it." In speaking of our dances he says the women "are dragged around the room to the accompaniment of the most hellish music."

SUGAR BEETS FOR ALKALI SOILS.

According to European experience one would expect that an alkali soil would be among the last to suit sugar beet culture. It is almost a maxim that this culture can not be successful on salty soils, since experience has shown that on such lands the sugar content and purity coefficient of the juice will be low, while the content of ash and saline matter will be high. In California, also, this has been fully verified where the sugar beet has been grown on the seacoast marsh lands; the best seed there produce roots with 5 per cent to 6 per cent sugar, and with a purity that is 20 deg. * * * It seemed at least probable that Glauber's salts and sal soda (sulphate and carbonate of soda) would also act unfavorably on the quality of the beet for sugar making. The culture experiments made at the San Joaquin Valley Station have confirmed this presumption, in so far that high grade roots have not been obtained. As certain alkali soils have been used with excellent results at Chino it is interesting to learn of the conclusion drawn by the chemists mentioned in foregoing. The data and observations recorded, while still requiring confirmation in regard to details, prove beyond question that sugar beets of good, and even high grade, both as to sugar and purity, may be grown on lands containing as much as 12,900 pounds of alkali salts per acre to depth of three feet; provided, that the percentage of common salt in the soil does not exceed an average of 0.04 per cent., or 1500 pounds per acre. Even this may not, of course, represent the maximum compatible with good quality, but is the highest figure that has yielded such, viz., good quality is the course of our experiment thus far.

Farmers in pulling their beets shoul

leave those patches standing which are of a coarse nature, and haul them home after the good beets are taken to the factory. The sugar company has a small patch near the factory, which, because of the alkali nature of the soil, pays them better to sell at \$1.25 per ton than to extract the small per cent. of sugar which they contain—*Leli Banner.*

BOYHOOD'S HAPPY DAYS.

"I'd like to be a boy again without a world of care, with freckles scattered o'er my hair; I'd like to rise at 4 o'clock and do a hundred chores, and saw the wood and feed the hogs and lock the stable doors; and herd the hens and watch the bees and take the mules to drink; and teach the turkeys how to swim so they will not sink; and milk a hundred cows and bring in wood to burn and stand out in the sun all day and churn and churn and churn; and wear my brother's cast off clothes and walk four miles to school, and get a licking every day for breaking some old rule; then get home at night and do the chores once more, and milk the cows and feed the hogs and curry mules a score; and then crawl wearily upstairs and seek my little bed, and hear dad say, 'that worthless boy, he doesn't earn his bread.' I'd like to be a boy again, a boy has so much fun, his life is one round of mirth from rise to set of sun. I think there's nothng pleasanter than closing stable doors, and herding hens and chasing bees and doing evening chores."—Deming (N. H.) Headlight.

A WOMAN'S LOVE.

This true incident furnishes a striking illustration of the deathlessness of true love—it proves the self-sacrificing devotion of a woman for her husband—a love that neglect cannot alter, nor abuse kill.

The heroine of this little "romance in real life" had for years supported herself and children and her worthless husband by doing washing, sewing, cleaning or anything of like nature that would add to her scanty income. While often threatening

to leave the drunken brute whose name she bore, she invariably weakened at the last moment and gave "poor Jack" another chance. If, as frequently happened, he became too abusive or too hilarious and the neighbors had him arrested for disorderly conduct, the faithful wife invariably paid his fine with her scanty earnings rather than have him linger long "in durance vile."

One morning when she came to do the weekly wash, we noticed that in addition to her general appearance of having been beaten and abused, four of Mrs. S——'s front teeth were conspicuous by their absence. Instantly surmising that Jack had been concerned in this, my aunt questioned Mrs. S—— regarding the missing teeth, and found as, she had suspected, that the oft-mentioned "Jack" had again been on the rampage and had varied his usual program by knocking out his wife's teeth.

"The brute!" exclaimed my aunt. "Sure and that's what he is when the drink's in him," agreed the wife.

"What did you say? What are you going to do about it; have you had him arrested?" all these questions were asked almost in a breath, by my aunt, who thought now the woman would have spirit enough to resent such abuse. "When are you going to get a divorce?"

"Divorce," echoed Mrs. S—— in a surprised tone. "I'm not going to get any divorce. Of course I was just awful mad," she continued in her plaintive, sing-song voice, "But as for getting him arrested and all that, it wouldn't do him no good and me neither. And besides, "she concluded as a last defense of "Jack," "them teeth was so old and rotten I'd a had to gone and had 'em pulled before long anyhow!"

L. W.

Conductor—"How old are you, my little girl?"

Little Girl (from Boston)—"If the company does not object, I'd prefer to pay full fare and retain my own statistics."—*Tid-Bits.*

FOR DIPHTHERIA.

The following remedy for diphtheria may be useful at this season of the year.

Take a spoonful each of turpentine and liquid tar; put them in a tin pan or cup and set fire to the mixture, taking care to have a larger pan under it as a safe-guard against the spread of flames. A dense resinous smoke arises, making the room dark. The patient immediately experiences relief. The choking and rattle stop, the patient falls into a slumber and seems to inhale the smoke with pleasure. The fibrinous membrane soon becomes detached and the patient coughs up microbes which, when caught in a glass, may be seen to dissolve in the smoke.

In the course of three days the patient entirely recovers.

Before using the ingredients named it is well to cover closely any articles in the room that will be injured by the thick smoke.

AMERICA'S FIRST DUEL.

In the year 1630 occurred the first duel known to have taken place on American soil, says the Pittsburg Dispatch. The principals, Edward Doty and Edward Leister, were servants of a Mr. Hopkins, one of the New England colonists. The men had quarrelled over some trifling matter; and resorted to the field for its settlement. The affair was stopped by the authorities, but not before one had been wounded in the thigh and the other in the hand. There is no law covering such matters, but the governor of the province decided that the men should be punished, nevertheless. At his orders they were sent to have their hands and feet tied together and lie in that condition 24 hours without food or drink. They suffered so much, however, that they were released at the end of an hour.

ECONOMY IN BUYING SEEDS.

Economy is not paying less money for a thing than you expected to pay. True economy is good management, and about

the worst management a farmer can be guilty of is to buy cheap seeds and thus cut the value of his crops in half—or worse. A stream cannot flow higher than its source and a crop cannot be any better than its seed. Real seed economy is buying seeds that bear the stamp of a house that is known to be reliable; then the planter is absolutely sure that he gets what he wants and what he pays for. In every part of the country dealers sell the absolutely reliable seeds of D. M. Ferry & Co., of Detroit, Mich., which have given uniform good results for the last forty-two years. Ferry's Illustrated Seed Annual for 1898, containing information that no farmer or gardener can afford to be without, will be sent free to any one making application to the firm.

SAFETY IN BUYING SEEDS.

There is no other way to measure the value of seed than by the value of the crop. A good crop simply cannot come from poor seed. Second-rate seeds will waste good land, good fertilizer, and good labor, and the crop won't pay expenses. Now, as the practical farmer cannot afford to waste time testing seeds to find out whether they are true to name, sound and clean, it stands to reason that the only safe way to buy seeds is to seek the protection of a name that has stood for reliability in the past. The great seed house of D. M. Ferry & Co., of Detroit, Mich., has sold seeds all over the United States and Canada for the last forty-two years, and the steady growth of the business is a sure indication that Ferry seeds have given satisfaction. Ferry's Seed Annual for 1898, a standard guide for farmers and gardeners, containing much valuable information, is sent free to persons writing for it.

"SUCCESS."

It lies through two swing doors swung to,
The attendance is always full,
Some by the door marked "push" get through,
And the rest by the door marked "pull."
—Ex.

BREAKING DOWN THE CORN STALKS.

The Southern method of harvesting corn leaves the stalks very much in the way of the next plowing, and if the land has been put in winter grain, as is the habit in the South, there is trouble in the harvesting from these stalks, as well as when the grass following is to be cut and raked. An easy way to get rid of these stalks is to run an "Acme" Pulverizing Harrow, Clod Crusher and Leveler over the field, and so break down the stalks then gather them with a hay rake and burn them in some convenient place. It will save trouble and annoyance and will pay any farmer to get and use it for its convenience not only for this purpose, but in other ways.—Henry Stewart.

The farmers of Maine have circumvented the beef trust. They have organized 1,000 fresh pork and beef clubs in that State, each club composed of ten members. The ten farmers belonging to a club arrange for a succession of butcheries. That is, a hog is killed every so many days during the winter season and the fresh pork is divided into ten parts, each family getting one part. This does not include the hams and other portions of the animal, which are salted or pickled for future use. The arrangement amounts to a co-operative meat shop. The farmers lose nothing and they get fresh pork all the time.—Ex.

A Boston man who is well-to-do, makes a business of paying postage every year on Christmas packages which are deposited in the postoffice with insufficient postage attached. He figures that in this way he makes many people happy who would otherwise feel that they had been forgotten by their friends.

The Texas people are "saying nothing and sawing wood," while the civilized world is eagerly watching Alaskan developments, Texas mines are quietly taking out ore that runs \$95.59 in gold to the ton. This is from the Mount Hudson mine in

the Llano district, Texas. The Hudson Gold Mining Company is pushing the work, and still better results are confidently looked for in the future. Another mine, the first important gold find in the section is the Schryver mine, about thirty miles north of the Llano river, and was formerly the property of a methodist minister.

Mr. John Muir, whose name is a synonym for the accurate and sympathetic observation of nature, has prepared for the Atlantic Monthly a characteristic series of papers upon the Parks and Reservations of the United States Government.

He opens a series in the January number with an account of "The Wild Parks and Forest Reservations." These number thirty in all without reckoning the Alaskan tundras, which he denominates "Nature's own Reservations."

When Russia thinks of the gold fields in Alaska and remembers what a short time ago she sold the country to the United States, she must feel somewhat as the woman did who sold her husband's old clothes to a rag man and afterwards discovered that there was a ten dollar bill in the pocket.

The Memphis Commercial-Appeal wearily remarks: "Sometimes we wish white wings would occasionally grow weary, that our gal wasn't a high-born lady, that all coons didn't look alike to us and that Mr. Johnson would turn that fellow loose and tell him to go to the devil." Doubtless many, who have grown tired of the "popular songs" will echo the wish.

The American Society of Irrigation Engineers will hold the annual meeting in Denver, Col., Friday and Saturday, March 25th and 26th next.

W. F. Cody, of "Buffalo Bill" fame is interested in an irrigation system in the Big Horn (Wyo.) basin, with about twenty miles of main canal already completed.

We have received a copy of the 1898 Poultry catalogue, published annually by J. R. Beabazon Jr., & Co., of Delavan, Wis. It is a gorgeous affair, its pages being printed in blue, gold, red, and green, two pages facing each other being in one color, the following two in another, and so on. The cover of heavy white enamel paper, is in green and gold, the border, composed of little chicks, is an unique idea. It is a valuable catalogue for poultry raisers and buyers and well worth the small sum of ten cents charged for it.

Through the courtesy of their general sales Agent, Mr. A. M. Crane, we are in receipt of a neat little booklet gotten out by the Illinois Steel Co., of Chicago. The pale blue cover with its title in silver, first attracts the eye, and the attention is held by the contents. The Illinois Steel works is one of the largest manufacturing enterprises in the world, and the pamphlet gives a very complete description of the plant, together with 28 half-tone illustrations.

"Mamma, what is hereditary?" asked little Robby, laboriously tripping over the syllables of the long word. "Why, it is—it is anything you get from your father or me," replied the mother, a little puzzled for a definition suited to his years. "Oh, I know," he exclaimed. "You mean a spankin', don't you mamma?"

In estimating the value of this flood tide of prosperity, we must not lose sight of the fact that what raises prices for producers also raises to consumers. The farmer gets more for his wheat, but he has to pay more for his clothes, sugar, soap, dishes etc.

The plea that the United States postal system is conducted at a loss is good if good at all, only because the government pays to the railway companies two or three times as much as the service in carrying the mails is worth.

The Denver Field and Farm has a colored cover in honor of '98, the inside page of which gives illustrations of the sugar beet factory, comprising over twelve different views.

We have just received from Utah, the First Annual Report of the Utah Farmers' Institutes, for the year ending June 30, 1897. It consists of 168 pages, and is decidedly well gotten up for a first attempt.

The report of First Assistant Postmaster General Heath strongly indorses free rural mail delivery. The tests in 29 states over 44 different routes are said to have been very successful.

Somebody has compiled figures showing that there are 12,631 Indians in Oklahoma, representing more than seventeen tribes. It is claimed that their number is increasing, as the births exceeded the deaths last year.

A California grower raised seventy tons of prunes on fourteen acres, an average of five tons to the acre. The fruit netted \$24.87 per green ton after deducting all expense connected with drying and also allowing \$1.00 per green ton for wear and tear on plant. On adjoining land not fertilized the yield was only three tons per acre and the price nearly \$2 a ton less. The following shows the comparative gain. Fourteen acres producing five tons each. Seventy tons at \$25 a ton, \$1750. Fourteen acres producing three tons at \$23, \$966. Leaving a balance of \$784 in favor of the fertilizer, which cost \$170.

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WITH OUR EXCHANGES.

MCCLURE'S MAGAZINE.

A very amusing little tale in the February number is called "The Wee Tay Table," by Shan F. Bullock. It tells of the many drawbacks that were undergone by a certain Mrs. Breen, of Irish extraction, in her efforts to pose as a leader of fashion among the numerous Mrs. Flahertys, Hoggans and Dolans, by whom she was surrounded. The leading article is by Dr. Fridtjof Nansen, the great explorer and deals with the subject of "Future North Polar Explorations," and contains many illustrations from pictures taken expressly for this magazine. "Some Great Portraits of Lincoln," in this same issue, gives a great number of portraits of this, to my mind, greatest of all heroes, many of them having never before been published.

LITERARY DIGEST.

In the Science and Invention Department of Jan. 29, is an article giving the conclusions of noted scientists as to whether or not suicide is a contagious malady. While it is not due to microbes and cannot therefore be strictly called contagious, the learned men say it is a moral contagion, due to the imitative faculty inherent in the human race. They base their conclusions upon a table of figures showing the vast increase of suicides in France, during sixty-seven years.

Another interesting thing in the same department is an account of how deaf mutes are taught to hear and speak, being a translation from the French of an article by Prof. E. Drouot of the National Deaf Mute Institution of Paris. The training of the deaf ear to hear is carried on by means of a specially constructed phonograph.

THE FORUM.

The first article in the January number

is "Our Coast Defences," certainly a very pertinent topic at this time of "wars and rumors of war." The writer, Nelson A. Miles handles his subject in a very able manner, taking the stand that, as Washington once said, "to be prepared for war is one of the most effectual means of preserving peace." G. G. Vest contributes his views on the silver question under the heading "The Future of Bimetallism." Among the many other interesting articles are "China and the Chinese Railway concessions," "Is it worth while to take out a Patent?" "The Incorporation of the Working-class" and "Education in Hawaii."

REVIEW OF REVIEWS.

"Plans for Currency Reform" are discussed by Charles A. Conant in the January number. William Howe Tolman sums up the progress of New York city under the administration of Mayor Strong. Count Tolstoi, who is a strong adherent of Henry George's view of the single tax, writes of the "Doctrine of Henry George." In the review of the leading articles of the month those concerning the Hawaiian question receive the most prominence.

Some time ago we received a copy of the Australian edition of the Review of Reviews, which is published at Melbourne. The editors are W. T. Stead, of England; Albert Shaw, of America; and W. H. Fitchett, B. A., of Australia. It is arranged on the plan of the American Edition, especial attention being given Colonial affairs.

Under the side-head "Unused Australia" are given some rent figures which are so small as to be amusing. For instance, the rent paid for tracts of Crown land in New South Wales is a little over 1½d per acre, or about 6 cents per acre in American

money, while in South Australia they are still lower, averaging about 1-6 d per acre, or 1 cent in our currency.

SCRIBNER'S.

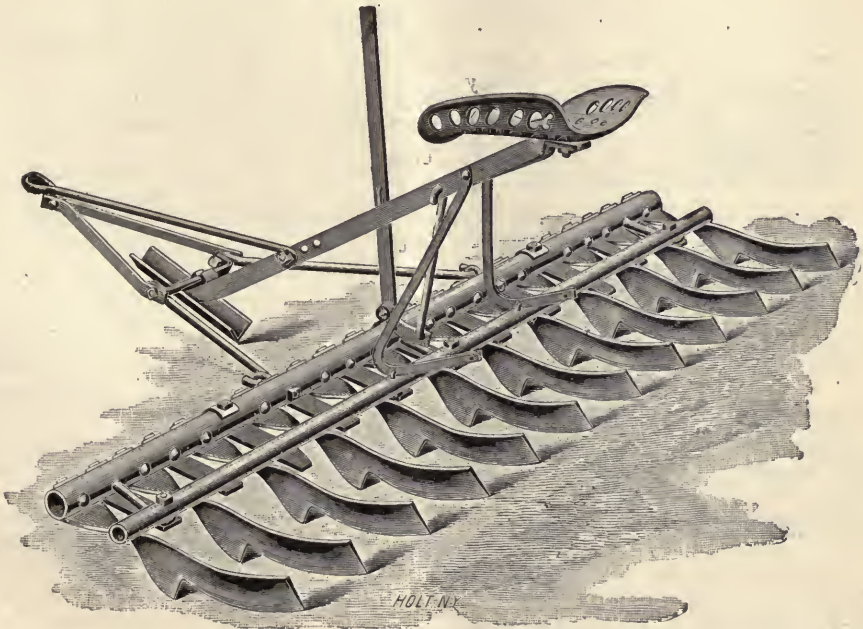
"The Story of the Revolution." continues full of interest. The siege of Boston is told of and a fac simile is given of the proclamation issued by King George III, August, 1775. The February number also contains "The Police control of a Great Election," by Avery D. Andrews, and among the short stories "The Key of the Fields," by Mary Tappan Wright; a rather disappointing story that makes one wonder

why it was written. Irish stories threaten to become as popular as "coon songs," the one in Scribner's is called "His Serious Doubts."

The January number of the State's Duty is a good one. The two leading articles are "Rule of Big Cities," by Rev. Henry Van Dyke, and "Labor in Russian Prisons," by C. D. Randall.

"New England Farming and Farm Scenery," is one of the best things in the Gentleman Farmer for February. The illustrations are beauties

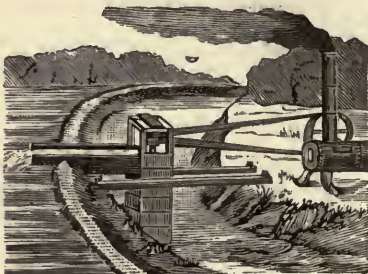
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AMERICAN RIVER, CAL.

THE IRRIGATION AGE.

VOL. XII.

CHICAGO, MARCH, 1898.

NO. 6.

THE PROGRESS OF WESTERN AMERICA.

The War Cloud.

Not since the firing on Fort Sumpter caused the blood of old age to leap with youthful vigor through his veins, and his eye gleam with the fire of patriotism, has anything occurred to rouse the American people to such intense excitement as did the news of the Maine disaster. The people throughout the land, north and south, east and west, regardless of party, joined in voicing their sorrow for the dead and their horror at a deed so atrocious. Not alone did we mourn, for words of sympathy came from foreign powers. Not only did the nation weep, but there came from thousands the cry for vengeance on the perpetrators of such a deed, and a war between Spain and the United States seemed eminent. John Stuart Mills once said:

"War is an ugly thing, but not the ugliest of things; the decayed and degraded state of moral and patriotic feeling which thinks nothing worth a war is worse."

The Americans cannot be charged with this "decayed and degraded" feeling, for they are willing—nay eager—to fight in defense of their country. And this is as it should be. What though it be true that many men in public office are corrupt; what if there are many abuses that should be righted; what though might is oft-times stronger than right; all this and more may be true—is true—and yet the stars and stripes are still worth fighting for, and brave men are still willing to bleed and die for the sake of the red, white and blue.

It is not the men in office that we fight for—not for the sake of boodling aldermen and scheming politicians, but for the land our fathers bought with sacrifice and suffering and the flag they raised is still worthy of defense.

John Patterson's Plan.

John Patterson, a well known resident of Minneapolis has signified his intention of getting 100,000 men to go to Cuba, for the purpose of taking up land holdings there. He thinks the Spaniards would not dare molest such a large number of men who would go for the purpose of making a living, not for war. Americans owning large tracts of land in Cuba, will gladly divide these into small tracts for the intending settlers, and will wait for their pay. Mr. Patterson thinks it would be very appropriate to land his 100,000 men in Cuba on July 4, and so far his efforts to raise the required number are meeting with such success that possibly his wishes may be realized.

Trees For Tennessee.

Everyone agrees that the destruction of the forests is very damaging to the land. This however will not bring back the trees, and no one seemed to have a feasible method of remedying the evil, until a Tennessee man recently suggested a plan which seems to be practical as well as novel. The gentleman mentioned is Major Vanderford, professor of agriculture in the University of Tennessee, and director of the Agricultural Experiment Station, and he thinks he has

a simple plan by which Tennessee can be reforested. It is to remit the taxes for twenty years on all lands where trees are cultivated, that is land set aside for trees and protected from stock and fire. At the end of twenty years this land will be very valuable to the farmer and can then be taxed. This would probably not be practicable in the large lumbering districts of the northwest, but for small farms, such as Tennessee mostly consists of, would be eminently so. As Major Vanderford says, on almost every farm there is a small patch that is not suitable for cultivation, and yet has to be taxed, but if this portion were planted in trees and the taxes remitted on it for twenty years, it would then be worth a great deal, and the remittance of taxes would be an incentive for the farmer to raise trees.

Certainly the plan is worthy of investigation.

Our Navy. The excitement concerning the Spanish question has brought before the eyes of the public the inadequacy of our navy. It has been well said that the best way to avoid war is to be so well prepared for it that foreign powers will fear to engage in combat with us. The United States is a great and mighty nation; her situation is such as to give her the same natural advantages in a struggle as Russia possesses, but at the same time we cannot go to war without preparation, and the fact that we are so "big" is no guarantee that we will never have to fight. Assistant Secretary Roosevelt contributed an article to the January number of *Gunton's Magazine* in which he discussed in an able manner "The Need of a Navy." So sensible are his views that we regret not being able to quote the whole. He says in part:—"One of the penalties of desiring to speak one's mind is that the man so speaking it must be ready to back up his words by acts, unless he is willing to find himself in a very humiliating position. This applies just as much to a nation as to an individual. . . . If, as is the case of the United States, there is no great

military empire abutting on the country in question, then it must look primarily to its navy as the means of carrying out any policy on which it has resolved. . . . Aside from Great Britain, however, practically every other nation which could by any possibility have trouble with us would have to meet us at sea. This of course means that if the United States is to have any foreign policy whatever it must possess a thoroughly efficient navy." No one but a man devoid of either knowledge or patriotism would assert that we ought not to have any foreign policy, at all, as that would give us the unenviable reputation of either having no opinion of our own concerning questions regarding other nations, or else having one and fearing to express it. Mr. Roosevelt expresses truth in a nut shell when he says: "If we build and maintain an adequate navy, and let it be understood that while we haven't the slightest desire to bluster or to commit any wrong, yet that we are perfectly ready and willing to fight for our rights, then the chances of war will become infinitesimal, and no power will dream of protesting against the Monroe doctrine."

The Frozen North.

To the one who measures everything on a dollar and cent basis, whose first question regarding a new discovery or invention is "What is it worth?"—not to the general public but its money value to the owner—it will be hard to give a satisfactory explanation of why men desire to reach the north pole. Tell him there are valuable mines, or lands where crops may be grown and he can realize why men risk so much in the endeavor to reach it; but to tell him that noble minded, unselfish men are willing to undergo all the perils of ice and snow and cold solely in the interest of the science they love, would be like speaking to him in an unknown tongue. Scientific research for its own sake, with no hope of personal gain, is beyond his comprehension. But there are many who can understand. It was the motive which animated the men of the past—men who spent their

lives in poverty for the sake of demonstrating some scientific truth, who received the contempt of their contemporaries and the gratitude of their successors.

Like the magnet that attracts to it bits of iron, so the pole, with irresistible force, draws to it the seeker after knowledge. Reaching the pole would solve many perplexing questions; would prove the truth or falsity of many theories regarding the earth and its formation. The commonly accepted theory, borne out by the fossil plants, indicative of a warm climate, found far toward the north pole, that at one time the northern portion of the globe had a tropical climate would be proved or disproved, in all probability, by reaching the limit. This theory was the foundation upon which a book "Paradise Found" was written; the author claiming that the Garden of Eden was located at the north pole, which succeeding ages had changed from a tropical garden of fruit and flowers to a land of ice and snow.

Great additions will be made to the world's knowledge by the brave adven-

turer who succeeds in reaching the goal. For that it will be reached in the near future, there is but little doubt. Years ago Sir John Barrow wrote: "The north pole is the only thing in the world about which we know nothing, and that want of all knowledge ought to operate as a spur to adopt means of wiping away that stain of ignorance from this enlightened age."

For almost three hundred years adventurous spirits have attempted the dangerous feat of reaching the pole—not all of them with any scientific purpose in view. Many a one making the attempt simply in a spirit of daring and a desire to outdo his fellow men; the same spirit which animates the man who attempts any dangerous feat, or engages in any contest. We give to the winner honor and applause, whether he wins in the political race or breaks the record on a wheel. Therefore give the sturdy adventurers hearty praise for what they have already accomplished, and best wishes in what they will still undertake.



IRRIGATION VS. CULTIVATION.

BY "INDIANA."

"The mistakes of my life have been many," is the hymn that might be truthfully sung by the irrigator, as well as by many another man. In nothing pertaining to irrigation does he make a greater mistake than in supposing that water alone, without cultivation of the soil, will insure him a crop. Cultivation is just as important to success as irrigation.

One of the experiment station reports states that it had been found by experiment that good results could be obtained by simply loosening up and cultivating the soil both before and after planting a crop, whereas if this were neglected, fertilizers had to be used to insure any kind of a crop.

Air is needed as well as water to change the nitrates and phosphates in the soil into foods that can be assimilated by the plant to sustain its life. Hence it is necessary to plow the ground and throw up the sub-soil to the air, thus giving it a much-needed chance to become aerated. One of Franklin's wise maxims was, "Plow deep and you will have corn to keep."

In irrigating your motto should be, "Not how much but how well," time-worn as it is from its continued use as a class motto for succeeding generations of graduates. Do not go on the principle of the mistaken housewife, who thinks that the more dust she makes in sweeping the cleaner she is getting things, and gauge your chances of a crop by the amount of water you use. It is not the amount of water that gives success, but the manner of applying it; the knack of getting just enough at the right time. Often the man who expends the most time, labor and money and uses the most water in irrigating his land has very indifferent crops and he blames the system for what is his own mistake. For in this, as well as in everything else, there is a right and a wrong way to do things.

It has been truly said that "The most successful irrigators combine deep plowing with clean cultivation, thus producing the largest amount possible from a limited area."

Insufficient moisture is not due so much to lack of rainfall as to unequal distribution of what does fall. And a plan to conserve or save the moisture is of as much benefit (except of course in arid regions) as is irrigation. This conservation of soil moisture, as it is called, is one of the many lessons we may learn from Dame Nature. Go to the woods and see how well she has economized the moisture that fell. The dead leaves that have fallen and the decaying vegetation cover the ground with mulch, which prevents the evaporation of the moisture as well as

fertilizes the ground. Scrape aside this upper covering and you will find the soil underneath moist even in a dry time. This is one reason why the destruction of the forest leads to aridity of the soil. Not long since I read an article in which the writer spoke of the costly lesson Mexico learned regarding the destruction of her forests and deplored the fact that the people of the United States seemed indisposed to profit by her example, but preferred to learn in that dearest of all schools—experience.

Moisture in large quantities is necessary to the life of the plant and it is also necessary to the soil in order that the plant food may be rendered available, for the roots can only absorb soluble food. Few, if any, soils are so destitute of fertility that they can not support vegetable life if the mineral plant food contained in them is rendered soluble for the plant's use. It is this principle that transforms the desert into a garden when water is applied, the minerals in the soil becoming soluble.

There are many portions of the United States where irrigation is not necessary, provided the moisture is conserved, and even with irrigation conservation is an equally good plan. There are seven ways by which this may be accomplished, according to experiments tried at one of the experiment stations, and the first and most important is by plowing and cultivating. Not the surface plowing so much in favor among farmers, but the kind that buries the sod and any refuse that may be on the surface and pulverizes the soil into minute particles, which being thus broken up, absorb a much greater amount of moisture from rains than would be the case if the ground remained hard and lumpy. After plowing the next resort is to the harrow and cultivator, which should be used frequently. The roller is of advantage on certain soils; those, for example which are loose and sandy or gravelly, as they need something to render them more compact, for if too loose and porous the rain drains right off.

Mulching also serves to conserve the moisture, as we see in the forest where the leaves act as a mulch, but this is not a practical method on the open fields of the farm, where no trees shelter them from the sun's rays. Then, too, sufficient herbage for this purpose would be hard to obtain, so this method is of little practical value.

Underdrainage is very important in this respect. Only the free water that comes to the surface is removed by the underdrain, thus leaving the upper part porous and ready to absorb the next rain, while the surplus water is carried through a drain to a reservoir for use in dry times.

The influence of the wind in drying out the soil is well known and may be lessened by building hedges to act as wind breaks, which serve to protect the fields to some extent in winter and break the force of the winds in summer.

The humus or black soil caused by the decay of vegetable and animal matter is a great storehouse for moisture and nitrogen. This humus is

supplied by a change of crops, by what are termed "cover crops," and barn manure. Crop rotation is valuable in producing this humus, and for that reason it is well to change your crops from season to season, instead of growing the same thing on the same field year after year until the soil is exhausted and much has to be expended in fertilizers to make it any way productive.

Certain mineral substances may be applied to the ground with good results, as besides being indirect fertilizers, they are good conservers of moisture. This is true of salt, lime, etc. What is called alkali soil is found in numerous districts of the West and is the cause of many arid places. This alkali is a mixture of potash and soda, the latter being the most injurious to the soil, and is formed from the decomposition of the feldspar in granite. The alkali is washed down by streams from the granite hills into the valleys, where it is deposited over the surface, making practically a desert if nothing is done to counteract its influence. Here minerals come in good play, though thorough drainage, together with plenty of water judiciously applied will remedy this evil and do away with the obnoxious white deposit. Lime, gypsum and salt, being good conservers of moisture, may be applied to some grounds with the best of results. Quick lime is especially good for heavy clay soils and also on sandy ones. Lime is beneficial on boggy, marshy land, as it helps to act on the animal and vegetable matter remaining decomposed on the soil.

And lastly, to conserve moisture, select the right crop for your soil. Don't try to grow a crop on a sandy soil that requires a loamy or clay soil to do well. And *don't* try to grow grain in your orchard. It takes the moisture that should go to the trees, and this robbery has a bad effect on the fruit. Then another thing, small grain planted in between the trees prevents a thorough cultivation of the soil, which is so important.

After the irrigator learns the A. B. C.'s of irrigation—to plow and cultivate well before turning on the water and to make his furrows for water straight instead of crooked—his next lesson should be to avoid using too much water. There is no need of having a stream run through your fields with such great velocity as to wash up the soil and carry it further down to be deposited as a fine covering which will bake into a hard crust as soon as the water is turned off and the hot sun given a chance to get in its work; for the tender shoots of plant life cannot force their way through this hard upper surface. A gallon of water judiciously applied is worth a barrel of it put on haphazard, hit or miss fashion.

The principle of the thing is the same, whether you are watering a small garden patch or irrigating a vast tract of land and the good and bad methods may be exemplified by telling of the two Indiana gardeners who attempted to raise cucumbers last summer. They were next-door neighbors, each having a small garden and each being equally ignorant

on agricultural subjects. As we all know, last summer was a hot, dry time and we also know, if we have the slightest acquaintance with cucumbers, that they are a vegetable which requires a vast amount of water to do well at all. If you expect to have cucumbers of any size in a dry season you will have to carry water to them—that is if you live in Indiana, where irrigation is not practiced—and when you have pumped up bucket after bucket full of water from the well and carried it to the cucumber patch at the “far end” of the lot (the vines would be planted, of course, farthest from the pump of any other vegetable) you will be willing to take your oath that the cucumber is about the driest thing on earth, not even excepting the hard drinker on the “morning after.”

But to return to our neighbors, or rather to our neighbors' gardens. Like the old song of the man who had plenty of peanuts, “One man had plenty of cucumbers while his poor neighbor had none,” at least none worth mentioning. And the one whose crop was a failure had been most assiduous in carrying water all through the heat of summer. He put on bucket after bucket of water, but the hot sun drank it up, the ground baked hard, and the vines received but little of the moisture that was furnished with lavish hand.

The other man, being a Yankee, devised a scheme whereby he not only kept his vines moist, but saved himself much labor. He put old tin fruit cans between the hills of cucumbers, filled the with water, and in each can put a woolen rag, one end of which was in the water and the other laid along the ground close to the vine. The rag acted as a syphon and through it the water oozed slowly but surely to the plant, keeping it moist and causing it to produce cucumbers that astonished the natives. One applied water judiciously and the other did a great deal of watering without result.

It is claimed by some that it is a good plan to irrigate in winter so that you may have the aid of the frost in mellowing and breaking up the ground. If the land is new and water plentiful, flooding may be resorted to with good results, and it will do all right for certain crops, such as alfalfa, the small grains, onions, etc., but is injurious to many other crops. In irrigating corn and potatoes, for instance, the water should be kept in the furrows between the rows and on no account allowed to rise above the plants. Unless the ground is very wet, irrigate before planting any small grain or seed.

Successful irrigators, one and all, lay stress on *cultivation* as well as *irrigation*. One writer, in an article regarding this subject says: “Most important of all, it should be borne in mind that, important as is irrigation, thorough cultivation is still more important. To soak up the ground time after time only to let it stand and dry out as hard as a brick, is to waste time, water, seed and labor. A thorough irrigation tends to compact the soil. Unless the surface is thoroughly stirred at the proper time, the ground, unless it is very sandy, becomes hard, evaporation is rapid and plant growth is retarded or even smothered out.”

HINTS FOR SMALL FARMERS.

For a small amount of land, say from ten to fifteen acres, the small furrows should be about sixty feet apart and the surface between them smooth. A stream of water three feet wide, six inches deep, with a current of about three miles per hour will irrigate about ten acres in about twelve hours. It should be irrigated every fifteen or sixteen days and cultivated after each irrigation. About 600 barrels of water will be required per acre. In case the land is steeply sloping, run the furrows across the slope—instead of down it—as otherwise the ditches and crops would be washed out and the velocity of the water would be so great that it would not remain in one place long enough to moisten the soil.

On the average soil (the sandy loam found in Southern California) farm and orchard crops require water thirty-four inches in depth applied over the whole irrigated area in the course of one year; land of a semi-arid nature, where the sub-soil is not open and porous, will require water six to fourteen feet in depth in time of one year, water applied every ten to thirty days.

One Western man waters a large garden by means of an eight-foot wind mill and a well twenty feet deep. By storing water from one season to the next, he can with the same power irrigate fifteen acres. Another Westerner has a twelve-foot mill and a six-inch cylinder which lifts the water forty feet to a reservoir on a hill side. This reservoir is forty by sixty feet and four feet deep, and the fall is sufficient to irrigate ten acres of corn, cabbage and potatoes.

So many farmers make the mistake of trying to irrigate and cultivate too large an area. A small farm well tilled is much better than a tract of many acres but half attended to. Five acres of good Western land under irrigation and cultivation will support any family of ordinary size. Brigham Young, with his usual shrewdness, recognized the fallacy of one man trying to farm such a large amount of land, and the great progress and rapid extension of irrigation in Utah was due to the fact that her farmers were limited to a small tract of land, the maximum farm being only twenty acres, and were obliged to cultivate and care for that amount thoroughly. By the interest and aid of the Mormon church money was furnished to build the canals, and zealous missionaries secured the colonists to occupy the lands reclaimed from the desert.

According to Mr. Van Dyke in his book, "Mystery and Mastery of Irrigation," subterranean irrigation is classed with the methods that are failures, yet for small areas it can be used to advantage many times. The following simple and economical plan was tried some years ago at the W. Virginia station, by Prof. F. W. Rene, and might be imitated by small farmers with good results and at small outlay:

"Place the tiles slightly in the surface of the ground or any convenient depth. Give them a slight incline, this varying according as you have pressure or not. In most cases the water is scarce, and the object is to get it to the roots of the plant with as little waste as possible. The

THE IRRIGATION AGE.

plan followed at the station last year was to place common porous 2½ inch drain tiles in a continuous row, end to end, on the surface of the soil, and vegetables were planted on either or both sides of the line. The tiles were a foot long, and by pouring in the water at one end of the line it was distributed at the joints throughout the whole length desired, when the opposite end was stopped up. Take celery as an example crop for irrigation on uplands. We plant the celery as above stated, and while it is young we have simple surface irrigation; but as the crop grows we bank it up, and finally have the tile covered, and thus have sub-irrigation. The tiles are cheap and last indefinitely. When the celery is harvested, the tiles are dug out also, and piled up & r used for sub-irrigation in greenhouse beds. Potatoes and various other crops can be grown in the same way. The celery watered grew well and did not rust. Besides this we were able to water twenty times as much space in the same time as in the ordinary way with open ditches. Besides saving time this plan delivers water where it is most needed, and we have reason to believe is fully as economical with water as with time.

Rows of celery watered in this manner were planted in a potato field, leaving every other space between the potato rows vacant, so that two rows of potatoes could be dug together when ripe. Besides watering the celery, the moisture reached the tops of the potato hills as was plainly seen every morning by the dampness of the surface throughout the intervening space; thus showing that the watering was sufficient for at least 3 feet 3 inches on each side, or 6 feet 6 inches in all, the rows being 3 feet 3 inches apart. Where the rows were on a slight incline, we slipped a piece of tin between the joints and held the water where it was needed; then by pulling it out and inserting it further down another section could be treated. The section can be made longer or shorter, according to the angle at which the ground inclines.

A SEASONABLE BLUFF.

" 'Tis now the time when buds do blow,
And roses burst their tender fetters,
And fair, wise women whom we know
Sit down and write regretful letters.

"Dear Aunt Jemima, I so grieve
I can't invite you all to stay here;
Because Chicago we must leave—
My health grows poorer every day here.

"We rent the house and go abroad.
Belinda wishes me to utter
Her sorrow not to see your, Maud—
How kind of you to send that butter."

THE CESSATION OF IRRIGATION.

THE CAUSES THAT HAVE LED TO IT AND THE REMEDIES PROPOSED.

BY W. G. MOUNT, LADORE, COL.

Judging from the almost complete cessation of irrigation enterprises, by ditch and reservoir companies, it would appear that a statement lately made by the the State Engineer of Wyoming in his report, was correct, namely, that their security for any return on their investment was so very slight that it caused them to hesitate before engaging in that kind of enterprise. I have been investigating for several years with the idea of locating the cause of such a state of affairs, and I ascribe it as follows: First, because the settlers who are already located on the land which might be covered up by the proposed ditch, are unwilling to pay the cost per acre, to further improve their land, if they have a ditch that covers even a small portion of it. I noticed this very particularly in the case of the San Luis valley, and also the Bear river, Utah, ditches. Farmers under the ditches mentioned have told me that it was safer for them to trust to the little water they had, or to almost dry farming, as was the case in Bear River valley, Utah, than to pay for irrigation at the cost per acre asked by the canal company.

Again the class of settlers who are looking for land now, contain a number that have been forced off of their farms in the Eastern states by the mortgage holders and they come here with two prominent ideas. First, of earning their living, while looking for land, and second, of never giving another mortgage if possible to avoid it. Therefore if they find the only land available is covered by a canal controlled by a company who asks at once for a chattel or crop mortgage to secure the payment for the water necessary to irrigate their land, even the first year they are afraid and fly the track immediately, preferring to look further.

I would like to propose two remedies for this state of affairs, which, even if they do not meet with approval, may suggest something better to those who are making irrigation their whole study. The first is for the state to guarantee a return of at least three per cent on the investment, providing that the proposed ditch or reservoir should meet with the approval of the State Board of Engineers, both as to site and cost. The next is the co-operation of capital and labor, the labor furnished by intending settlers.

In this way, by capital putting up dollar for dollar against the value of the labor done by the settlers, the settlers could sustain themselves while working, and the reduced charges necessary to pay the interest, and finally the principal would be much easier for them to pay.

I am fully assured that I know of at least three irrigation enterprises that could be carried to a paying basis very quickly if the necessary capital could be found while building the ditches and reservoirs. One in particular is in this section. It would be necessary to build a dam costing between \$7,000 and \$8,000. The location is a fine one, the drainage for supply being large enough at least to irrigate between four and five thousand acres of land.

Much of the land will produce fruit. There are two small orchards in bearing. Small grains and alfalfa yield in profusion and there is fine summer and winter range near by.

THE WISE REPRESENTATIVE.

The following verses contain as much truth as poetry:

We took and we sent him to congress
 To keep this here country in check,
 An' we reads the Congressional Record,
 An' we know that our member's on deck;
 For all up an' down in its pages—
 That's printed in Washington town—
 He's hollerin' out "Mr. Speaker!"
 An' the speaker—he hollers, "Set down!"

Now, some folks that's sent by the people
 Way up ter the National hall,
 Jest sits thar from mornin' till evenin'
 An' never says nuthin' at all.

But our man is up ter his business—
 He don't make no speeches profoun';
 Just jumps up and yells "Mr. Speaker!"
 Till the speaker—he hollers "Set down!"

That's better, I take it, than talkin'
 The time and his senses away;
 Than makin' the galleries listen
 Ter folks that heve nothin' ter say,
 That's better than bill, an' amendments,
 Than rearin' and pitchin' aroun';
 He jest calls the name of the speaker,
 Then takes his advice an'—sets down!

If twarn't fer the fact that we sent him—
 Because it's a good place ter stay,
 An' told him to say we air livin',
 In silence he'd pocket his pay,
 His business is jest to remind 'em
 We live in a wide-awake town;
 He knows when ter yell: "Mr. Speaker!"
 An' jest when it's time to set down!

—Atlanta Constitution.

THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs, Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

THE CANAIGRE ROOT.

Canaigre is a species of sour dock growing on the hot, sandy deserts of southern Utah, New Mexico, Arizona and California. The tubers are small and yellow, resembling sweet potatoes, and grow three or four in a bunch. They contain about 15 per cent or more of tannic acid, and require three years to mature, or reach the highest state of perfection. When cultivated, the roots grow large enough to yield from 10 to 15 tons per acre. The marked price for this product in its green condition as harvested, is about \$9.00 per ton, and when sliced and dried, ready for shipment to tanneries is \$30 or more, thus showing that it takes three tons of green roots to make one of the marketable product. Markets are found where the acid is used for tanning purposes, instead of the old tanbark juice, to which canaigre liquor is much superior.

The State of Utah pays a bounty on canaigre culture, when enough money has been expended by any person or company to guarantee permanency to the industry. A factory has been erected in New Mexico, where the roots are sliced and dried and shipped to the tannic markets of the world. The hides tanned by canaigre have a much more elastic appearance and are said to take on better polish and wear longer when manufactured into boots and

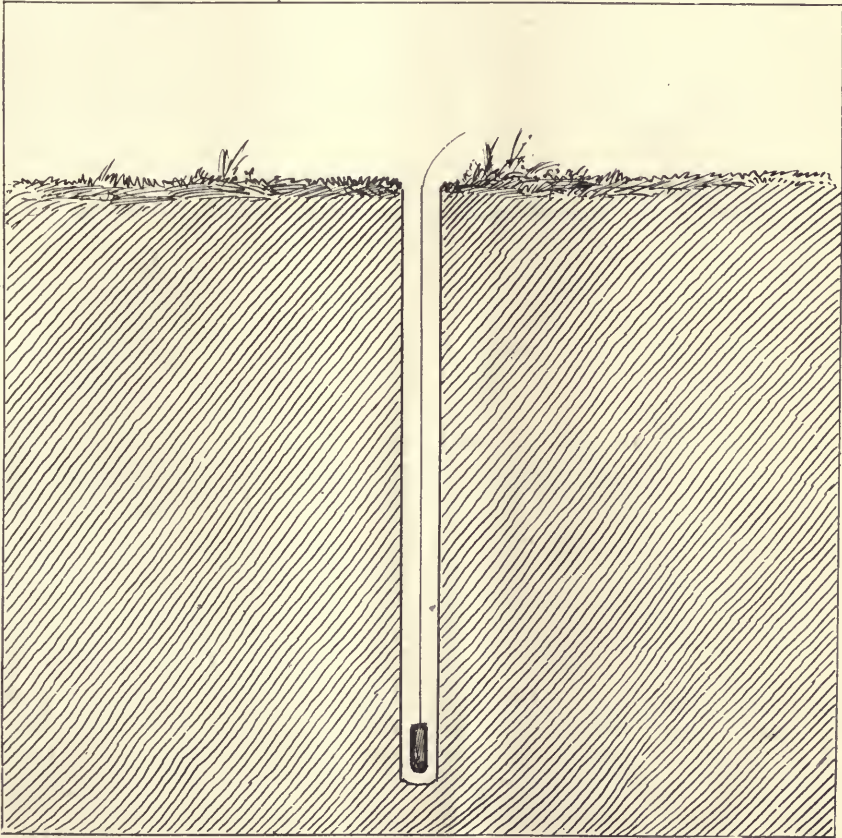
shoes, gloves and harness. Some experimental farmers report good yields from planting the seed while others say the only profitable plan is to cut the tubes in pieces about one inch in length and plant the same as potatoes. The roots grow abundantly in the cultivated fields where the climate is hot and dry, but do not thrive under excessive irrigation. Farmers are expecting good returns from canaigre when capitalists erect tanneries in the vicinity of the natural home of the plant.

TREE PLANTING BY DYNAMITE.

One of the most successful methods of planting an orchard is the use of dynamite in loosening the sub-soil and hard pan. A small charge of dynamite, properly prepared, will break up the ground for several feet beneath the surface and open all the food fountains for the tree roots. When trees are planted, in a dynamite hole, they grow more thrifty, bear sooner and have more fruit and a better quality than those planted by the old methods. Many of the new orchards, planted in the West, have been dynamited, and the thriftiness of the trees have surprised even the oldest and best horticulturists. The cheapness, too, recommends the system, and brings it within the reach of every fruit grower.

The orchard is mapped out and stakes are driven in the place where trees are to be planted, before the dynamiting is begun. A post hole digger, crowbar or auger is used to sink a hole about six feet deep, just where the tree is to stand. When the hole is finished, a charge of about one half pound of 30 per cent. dynamite is prepared to explode at the bottom. This is done by fastening a fuse, as long

strata, to a depth of ten feet or more and extend outward several feet. The surface will not be disturbed and no danger need be feared from any uplifted stones or earth. When the explosion occurs, the hole is dug for the tree directly over the spot loosened. Most fruitmen dig to a depth of two feet or more and fill with sand, leaf mold, manure or soil to the point where the tree roots come in planting.



as the hole is deep on the dynamite stick, with a fulminating cap fixed in the explosive tube. The dynamite is gently let down to the bottom, by the fuse, which is tied on substantially. Then the hole is filled with dry soil or sand, and tamped with a rounded pole or stick, after which the shot is fired as any other fuse charge.

A good, deep shot, with the fuse tamped solidly, will loosen the soil and under

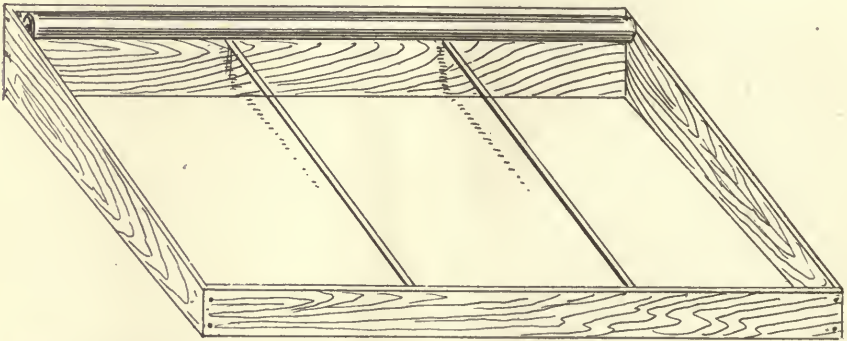
Then the roots are pruned, with a sharp knife, and the tree is set in the position desired. I have seen small cobble rocks tamped round the tree in filling in, to make it more solid. This is always governed by the ideas of the planter.

The cost of dynamiting usually is less than 20 cents per tree, in addition to the regular planting expense, and the results can hardly be estimated. I have assisted in

exploring a six foot dynamited hole and was astonished at the area loosened by the explosion. The water follows the open strata and stores up moisture, besides focusing drain channels to carry away the surplus from over irrigation or too much rain. A long tap root forms on most of trees, and, the branches penetrating the loose earth make such a formidable growth that winds do not effect the trunks and the trees grow straight. This method of planting trees is not merely theoretical or experimental but has been thoroughly tested and found to be beneficial. When once tried the fruitgrowers will always use dynamite.

sun shine in a day or two. Haul enough fresh horse manure and pile in a pyramid beside the hole, to fill to within six inches of the top of the ground. When the manure begins to smoke fork it over and let heat again.

Fill the pit to within six inches of the top with the manure and tramp well, after which add six inches of dry soil, leaf mold or new creek bottom land, free from weed seed, is the best. Around this, with the edges against the banks and reaching down into the soil, construct a frame of logs or boards, according to convenience. Have the front or side open to the sun, extend eight inches or more above the ground,



MANAGING A COLD FRAME.

Every spring I receive many inquiries about the building and managing of a cold frame for starting such plants as cabbages tomatoes, peppers and sweet potatoes. The same answers must be given in every case, and, as the questions are beginning to come in, I give my plan for what some call an outdoor hotbed. Select a warm spot on the south or east side of the fence, barn or outhouse, where the bed will be sheltered from north winds. About six weeks from the time plants can be safely transplanted without danger from frost, make the frame and sow the seed. If several varieties of plants are desired the bed should be large enough to hold all within one cover, hence for the ordinary farm garden I would make the frame twelve feet long and six feet wide. Dig this space into a pit two feet deep and let the

and the back double that, to give a good pitch to the cloth roof. Nail a four inch board or scantling, on the ends and sides to make a closed frame. Tack a cloth of the necessary length and width to the board at the highest side, and to a slim pole at the lower or front side. The cloth I use is ordinary white sheeting cut into two strips of four yards each, and sewed together lengthways, making a cover the size of the frame. After getting the cover arranged and the sides and ends banked up with earth put in two inches of dry sandy loame for the seed bed. If left covered this will heat in about two days when the frame is ready for planting.

Small seeds are best planted in rows, which can be made by drawing a stick across the bed, bearing down hard enough to make the mark one half an inch or more in depth. Drill the seed thickly,

cover with the fine soil and firm or pat down with a roller, shovel or hoe. Cut some forked branches from the apple or peach tree and stick through the labels into the soil when each packet is emptied. I use this plan in sowing cabbages, tomatoes, peppers, cauliflowers, egg plants, tobaccos and similar seeds. If sweet potatoes are planted I rake away the top of the seed bed and lay the potatoes as closely as possible without touching one tuber with another. Then cover with the dry earth and firm as with other seeds. As soon as planted I give the bed a thorough watering from a sprinkling pot or spray hose, using tepid water from the kitchen stove. The surface must be kept moist, but not wet until the plants are removed or they will burn. On warm sunny days the cover should be rolled up and fastened by strings or straps, for a few hours, and when the nights are extra cold or a storm is on during the day the cover should be protected by boards, blankets or straw put over the top.

Two or more cross boards of one or two inch thickness should extend from the front to back on a slant with the frame. These hold the cover from sagging when filled with rain or snow and prevents it from tearing when straw or blankets are thrown on to protect the frame from cold. If fleas should trouble the plants a little more attention to watering will drive them away. I have sown cucumber seeds in strawberry boxes and buried them in the cold frame until ready to transplant, with good results for earliness. The new onion culture requires such a frame for starting the plants, which are transplanted the same as cabbage. My experience has proven to me that onions germinated in the seed bed and transplanted to the open field when the roots are well formed, will yield almost double the crop and be more uniform in size requiring no thinning and less attention in cultivating. The exact time for making and sowing a cold frame varies with localities, but about the middle of March is most suitable for cold sections where the frames are most needed.

RENEWING OLD CURRANTS.

Currant bushes are generally neglected on almost every farm where special fruit growing is not made a business investment. The unpruned bushes grow in clusters and become the safe harbors for all kinds of insects that destroy orchard fruits. My greatest trouble with pests on orchard and shade trees has been traceable to the old currant clusters, and I have made some important discoveries in connection with the work of renovating the bushes. A few years ago I came into possession of a neglected lot containing about one hundred choice fruit trees and a similar number of currant and gooseberry bushes planted between. The bushes were completely wrapped in webs, the leaves stripped and the fruits shrivelled and not worth picking, while the apples, peaches, pears and plums dropped from the trees before maturing. The soil was good, the orchard young and the climate not too rigid, so I set to work to reclaim the bushes and trees.

In April I raked the old leaves and trash together, cut out all dead canes from the bushes and dead limbs and branches from the trees and burned them in small piles neath the trees. After thoroughly cleaning the ground I loosened the soil for tree feet round the clusters of currant bushes, to the depth of probably ten inches, using a short handle manure fork. When the digging process was finished I sprayed the bushes top and roots thoroughly, using the coarse or fire extinguishing nozzle of the sprayer. The solution used consisted of one pound of lime, one pound of copper sulphate—blue vitriol—and one tablespoonful of Paris green, dissolved in ten gallons of water. I used about two and one half gallons to each cluster and completely drenched the canes and roots. The first minute of showering brought out hundreds of black spiders, large and small, that had been secreted in the canes and under the leaves. They dropped in all directions and the ground was spotted with dead crawlers of numerous patterns and sizes. The same

strength of liquids was used on the bushes in another two weeks, or just before the leaves put out. When the currants set on I left out the lime and added one pint of flour to the ten gallons of spraying mixture, using the finest spray nozzle on the bushes and the coarsest in applying the solution to the trees. Again, when the currants were almost grown I sprayed with Paris green and flour leaving out the copper sulphate. The results were most astonishing, the stems being healthy, the foliage luxuriant and the fruits better than ever were seen on the bushes. There was not a blighted cane, spider web, or leaf mite to be found anywhere. The currant bushes were planted for Fay's Proflic, but never gave indications of being genuine until thus treated. I had no blight, worms or mildew on the Downing gooseberries that had not furnished a crop for several years on account of insects, fungus and disease. The fruit trees took a new lease on life and yielded enormously.

JOEL SHOMAKER.

PRUNING.

One of the most common questions asked by the farmer regarding tree farming, is "When is the best season to prune?" A question that, as yet, has not been satisfactorily answered. While pruning is especially necessary in the east, it is well to resort to it in the western states. The Nebraska experiment station devoted considerable attention to this matter in 1895, the experiments covering a whole year. Trees were pruned at the beginning of each month during the year with the view of determining which season was the best for pruning, but though results led them to believe that from early spring to late autumn was a better time than winter, as the wounds made had a chance to heal rapidly, this conclusion was not definitely established and has one great drawback from the fact that the branches cut off may contain fruit not fully developed and that other fruit may be torn down in the process. So the question is not much

nearer a definite answer than heretofore. In attempting to determine which method of pruning was best, the smooth method by using a knife or chisel, or by leaving the rough surface made by a pruning saw, the experimenters met with better success, as they demonstrated that smoothing off the wounded surface was time wasted as the rough one healed just as quickly. In fact, if there was any difference at all it was in favor of the rough surface.

As to what treatment was best in order to have the wound heal quickly and prevent checking, it was found that to leave the wound uncovered was almost certain to cause checking, while common lead paint was the best thing discovered for covering the wound to prevent checking, and next in favor was grafting wax. The checks readily serve as starting places for decay. Shellac and pine tar both are apt to soon crack and drop off, thus leaving the wound exposed. In removing a limb be careful to saw it off at the proper place. Where the limb joins the main trunk it broadens out into a shoulder or flange, and if the limb is cut at that point there is a large wound surface to heal, while if the limb is cut any distance from this, there is an awkward stub left. The best plan, then, is to take it off just at the point where it begins to swell, thus avoiding the large wound and also the long stub. Another thing of great importance in pruning is to see that your tree does not form a sharp fork at the top, as in that case it is almost certain to slip apart when the tree is loaded with fruit.

BROAD VS. NARROW TIRES.

The question of the width of wagon tires has been much discussed recently, and is of such general interest that a number of the agricultural stations have been trying experiments to determine which of the two, the narrow or broad tires, is the best.

The Agricultural Station at Columbia, Mo., have experimented quite extensively in this line during the past two years and

has come to the conclusion that the broad tire is far better in every way.

It is claimed that the public roads of the United States aggregate 1,500,000 in length, and that the total wagon transportation is 500,000,000 tons, at a cost of \$2 per ton transported 8 miles, or \$1,000,000,000 yearly. Over first class roads it is claimed one ton could be transported eight miles by wagon at a cost of only 80 cents, or two-fifths of the present cost. About \$20,000,000 is paid yearly for the maintenance of public roads outside the cities, with but slight improvement of the roads at the end of the year. Such an enormous out-lay causes the tax-payer to wonder if there is not some better method of keeping the roads in good condition.

Farmers generally admit that the broad wagon tires are better for the road, as they do not cut it up so badly as do the narrow tires, but they claim that a broad tire wagon will draw much heavier than a narrow tire, and that in mud they could not be used at all. For the purpose of exploding this theory the Missouri Station carried on its experiments with the broad and narrow tires on Macadam, gravel and dirt roads and on meadows, pastures and plowed fields both wet and dry, for over twenty months, so that the test might be made in all conditions of wet and dry weather. The net load in every case was

2,000 pounds, and in many cases the draft was much less with 6-inch tires than with the ordinary 1½ inch tires, so much so that 2,518 pounds could have been hauled on the broad tires with the same draft that a load of 2,000 pounds required on the narrow tires.

In fact, the experiments proved that under only three conditions do the broad tires draw heavier than the narrow ones. These conditions are as follows: "When the road is sloppy, muddy or sticky on the surface and hard underneath; when the surface is covered with a very deep loose dust and hard underneath; and when the mud is very deep and so sticky that it adheres to the wheels of both kinds of wagons." These conditions are rather unusual and of short duration.

Six inches is found to be the best width of tire for a combination farm and road wagon, and both axles should be the same length so that the front and hind wheels will run in the same track. The price of the two tires is about equal

The narrow tires cut up any road, gravel or otherwise, when hauling heavy loads over it, while the broad tires, with an equally heavy load, act on the principle of a roller or grader, improving the road bed.

England and some other countries have laws regulating the width of tires according to the load to be hauled.



PULSE OF THE IRRIGATION INDUSTRY.

IRRIGATING IN LOUISIANA.

Louisiana is one of the states in which irrigation is beginning to be extensively practiced. Her two chief staples, as every one knows, are sugar and rice, and the latter requires a great deal of water. The Hall Farm is a large plantation that is soon to have the largest irrigating plant in the state, and will be in operation in time to flood the early rice. Another plant is that of the Jennings Planting Co.

A tract of a thousand acres of fine rice land has been opened up near Jennings, La., by the Jennings Planting Co. This company will irrigate their own and neighboring farms with the new irrigating plant that is soon to be put in place. Work on the canal is pushed rapidly along. In some places levees 15 feet high have to be built to raise the water to the point where it will flow as desired. These levees are built in preference to a flume. As to the pumping plant, there will be a twenty-one inch suction centrifugal Morris pump with a capacity of 15,000 gallons per minute at a lift of over thirty feet, the power being furnished by a 180-horse engine. Besides irrigating some 150,000 acres of rice land of its own, the company will furnish water to farms adjacent to the canal, and as fast as possible the canal will be extended.

But the most important project of all, to the small farmers near Jennings, is the company that was recently incorporated at Jennings under the name of the McFarlain Irrigating Co., Ltd. This company has a capital of \$100,000, of which \$55,000 is paid up, and they intend putting in a plant with a capacity capable of irrigating from 6,000 to 10,000 acres of rice, this capacity to be doubled next fall. There will be seventeen miles of main canals,

with numerous branches and laterals. The main canal will be 100 feet wide.

With the aid of irrigation there seems to be no limit to Louisiana as a rice producer. In January last the Lake Charles Milling Company, St. Charles, claim to have broken the world's record in rice milling. They cleaned, polished, barreled and pocketed 1321 sacks of rice in one day.

MONTANA SOCIETY OF ENGINEERS.

The regular monthly meeting of the society was held February 12, 1898, in the society's rooms, in Merchants National Bank Building, Helena, Montana. The meeting was called to order at 8 p. m. by Vice-President F. J. Smith.

The other members present were Messrs. James H. Kerr, James S. Keerl, F. J. Taylor, Finlay MacRae, John W. Wade, T. M. Ripley and A. S. Hovey.

The following applications for membership were favorably considered and will be voted upon by letter ballot:

H. P. Clark, of Winston; E. I. Cantine, Helena; W. S. Fortiner, Hamilton, and the following of Butte: R. D. Grant, D. E. Heller, John MacGianess, C. W. Clark, B. C. Dunshee, C. F. Booth, R. T. White, J. K. Clark, A. J. Schumacher, C. H. Hand, August Christian, Samuel Barker, Jr., Max Hebgen, H. W. Turner, Wm. E. Donovan. Classified professionally, 7 are managers and superintendents of mines, 4 mining engineers, 2 civil and mining engineers, 2 civil engineers, 2 electrical engineers and 1 architect.

The report of the trustees was read. They approved the reports of the secretary and treasurer; they recommended additional book cases for the library. A motion was carried to publish the proceed-

ings of the 11th Annual Meeting held in Butte.

President Page appointed the following committees: State Engineer and Road Laws: F. W. Blackford, of Butte; John Herron, Marysville, and T. M. Ripley, Helena. The committee on papers are Eugene Carroll, Butte; Finlay MacRae, Helena, and E. R. McNeill, Boulder.

The society was much encouraged by the interest and activity of the Butte members. Some in particular are deserving of special credit. Plans were discussed to increase an interest in the society and of procuring more papers. If any member offers as an excuse a lack of time, he will immediately be referred to the past president's closing remarks: "So true it is, that it is not time which is wanting to men, but resolution to turn it to the best advantage."

DELINQUENT IN DUES.

Attention was called to the fact that several members are delinquent in dues prior to the present year. The society decided to take the matter up at a subsequent meeting. The secretary sincerely hopes that the society's books will present a better appearance before the next meeting than at the present time.

A. S. HOVEY, Sec'y.

IRRIGATION IN AUSTRALIA.

A gentleman who has recently come from Australia told the writer a few days since that the curse of irrigation colonies in that country was paternalism. The government of Victoria and South Australia have spent millions on irrigation schemes, the most of which have been failures because the settlers wanted everything done for them and lacked the American grit, perseverance and enterprise, to work out for themselves the problems of pioneer life. The trouble at Mildura, so this gentleman asserts, was that most of the colonists were younger sons of rich English families who were sent out to that new country with a few hundred or a few thousand pounds to invest. They knew

nothing about hard work, and had no practical knowledge of fruit growing or farming. And when their money was gone they wanted the government or Chaffey Bros., Limited, or somebody else, to put up for them, and convert their failures into success. They became the easy dupes of demagogues who made a crusade to get the Yankees out—for the Chaffeys were looked upon as Americans because of their residence in Riverside and Ontario, though they were Canadians. This was finally accomplished, and in the general financial distress the Chaffeys went to the wall. At present the government is trying to carry the enterprise through, and has loaned the people a large sum of money, but we judge from the Mildura Agriculturist that things are in a sorry condition and that the voice of the kicker is much heard in the land, though good crops have been raised and some fancy prices secured. The government having done much, demands for it do to more are loud and long, and the good old-fashioned American plan of working out their own salvation seems to find little favor with the people. Mildura has 12,000 acres set to fruit, and at one time boasted 6,000 population, or nearly that of Riverside. But our informant stated that he would not be surprised to see the whole tract abandoned and go back to a sheep range. And he said this would suit the sheep farmers, who are opposed to the whole idea of irrigation. If this, or anything like it, should be the fate of Mildura it will be a sad commentary on the paternalism that is such a popular tenet in the Populist faith.—Ex.

A NEW SCHEME IN IRRIGATING.

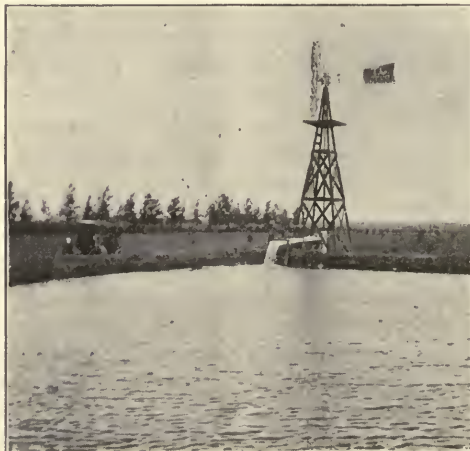
It may be true that there is nothing new under the sun. If it is then, John Yarnell, a Highland orange grower, has not made an original discovery, but has simply resurrected a prehistoric practice. So far as Mr. Yarnell is concerned, however, it is original; and if in use elsewhere, it is a dual discovery.

The principal supply of irrigating water in Highland is delivered on the 15-day plan, each irrigator's run repeating itself at regular intervals throughout the season. Formerly fifteen days was thought to be a long time between drinks for an orchard; but ideas change, and it is commonly believed that a thorough irrigation once a month is not only better for the trees, but entails less labor on the orchardist. Consequently the practice of watering one-half of the orchard with each alternate 15-day run has become quite general.

It was this method that led to Mr. Yarnell's discovery. His orchard contained an odd number of rows, the central row being analogous, as it were, to Mason and Dixon's line. When the north half of the orchard drank it was Yank, and when the south took water it was Reb. Mr. Yarnell frankly admits that a whole year passed before he was able to say whether it was irrigated once in fifteen days or once in thirty days; for it was watered on alternate sides on every 15-day run. While meditating upon this perplexing problem be noticed that that particular row looked remarkably well—that it had outgrown the others and did not show signs of thirst during the last days of waiting, as did those receiving water on both sides once in thirty days. Being a man who does his

own thinking, he began analyzing the water, and his conclusions ran somewhat as follows: "Where all the soil tributary to a tree is saturated with moisture, all the plant food therein contained is placed at the disposal of the tree, and the tree, supposing that the feast will be continuous, falls to like a lad at a picnic. A vigorous growth begins, and the consequent draft on the soil moisture forces the tree to suspend and perhaps to display the distress signal before the next irrigation. It follows, therefore, that this row, having had its rations more rationally supplied, has experienced no famine and has plodded along like the tortoise, to the first place in the race."

Acting upon this philosophy, Mr. Yarnell is this year irrigating alternate spaces (not alternate rows) in his orchard every fifteen days, thus giving water to alternate sides of each row on each run, the application being made of course, by the furrow system. There may, perhaps, be some minor objections to this innovation, such as the necessity, in cross cultivation, of going over the entire tract each time. There is little danger, however, of over-tillage, and the arguments in its favor should at least entitle it to a season's trial. —W. M. Bristol in California California.



STATE NEWS.

ARIZONA.

The farmers in the Salt River Valley are irrigating for all they are able at this season.

Two car loads of wool were recently shipped from Phoenix to Boston over the Santa Fe, making the twelfth carload shipped this season. The weather is so mild as to be very favorable for shearing, and farmers in the vicinity of Phoenix are daily arriving at that place with their heavy loads of wool.

Artesian wells in the San Pedro valley now number twenty-six. It is probable with little effort artesian water could be produced in other parts of the territory.

The following is the view taken by the Arizona Gazette:

"Parker, an enterprising member of the Ohio legislature has introduced a bill to require candidates for matrimony to submit to medical examination. This ought to be amended to compel all unmarried persons to pass an examination. Those pronounced fit to marry should then be compelled to do so. There should be no special privileges granted. If marriage is a good thing, push it along."

CALIFORNIA.

In the month of February the representative of a large mercantile house in Hamburg, Germany, closed a contract by which \$400,000 worth of California dried fruit is to be delivered in Germany the coming season.

INDIANA.

They say that La Porte, Ind., expects to have a factory for the manufacture of electrical motor carriages. The La Porte Herald states that the company for the manufacture of these "horseless carriages" has already incorporated under the name of The Munson Company, with a capital stock of 100,000, and as soon as a suitable location can be found and satisfactory

arrangements made with the business men of La Porte, the factory will prepare for business. If the factory is established there, it will be the only one of its kind in the state, and one of a very limited number in the West.

KENTUCKY.

As a result of a family feud—a native product of Kentucky—a duel was fought at Louisville with knives and pistols, two men are in a very precarious condition. This proves that dueling is not one of the "has beens" in Kentucky, at least.

An epidemic of smallpox is reported from Middlesboro; there are twenty-nine cases of it. The schools and saloons have been closed and Middlesboro is in quarantine as far as neighboring towns are concerned.

VIRGINIA.

The L. A. W. Bulletin and Good Roads in a recent issue has an article in regard to a bill that is to be introduced in the Virginia Legislature, which provides that all able bodied criminals shall be compelled to work on the roads. Any well man who is sentenced to jail or penitentiary for more than ninety days is compelled to work on the roads, not less than five, nor more than twenty five to be assigned to any one county. The assignment is to be for a year unless other arrangements are made. So far as work is concerned the convicts are under control of the county authorities, but, as prisoners, they are to "remain in the custody of the State authorities as if they remained in the penitentiary." The county is to provide them shelter, but the State must furnish the funds for their transformation, guarding, clothing, medical attendance and food. It seems this would not only insure good roads throughout the state but would furnish the solution to the "convict-labor" question that causes so much discussion. Other states would perhaps do well to follow Virginia's example in this matter.

UTAH.

Utah is to have a new sugar beet factory, the contracts for the structural iron having been let. The site for the factory has not been definitely decided on.

The big wharf at Tampico, Mexico, was destroyed by fire Feb. 20. It was considered one of the finest on the continent and was constructed by the Central railroad under the supervision of the Mexican government. The total loss was close to \$2,000,000, fully insured.

MINES AND MINING.

On March first there is to be a meeting of the miners of Arizona, at Phoenix, that state, to organize an association. It is hoped that every county in the territory will be represented at the meeting, as it is a matter that should be of general interest to every one engaged or interested in mines or mining. Much good can be done for the mining industry by an association of this kind.

According to the Arizona Daily Gazette people who contemplate going to the Klondike should pause and reflect on the show for prospecting in Arizona, before risking life and limb in the far north. The Gazette says that one mine in Arizona—the United Verde, at Jerome—produces more bullion annually than does the whole territory of Alaska.

Col. Geo. R. Davis, director general of the world's fair, has concluded the purchase of 3,500 acres of placer ground in the South Pass mining district, Fremont county, Wyoming, at a cost of about \$500,000. This vicinity is rich in placer gold and Col. Davis intends working it for all there is in it. A ditch is to be built, costing about \$15,000, for the purpose of bringing the water from the Sweetwater river to wash out the gold, and the best and most modern appliances will be used.

To give an idea of Washington's resources as a mining state it is only necessary to state that in Stevens county and

the Colville reservation there are 2000 claims being worked with good results.

"Alaska bread, guaranteed to keep good for five years, is now advertised by the coast outfitters," is the latest item from a Western paper.

An important gold discovery was recently made near Garden City, a town in Rich county, Utah. Three assays were made of the ore found, one of the poorest samples assayed \$9.50 of gold, the next best \$20.80 and the best \$361.20. The body of ore is about twelve feet thick and was struck at a depth of 150 feet.

Marble has been discovered west of Custer, S. D., consisting of two grades, one of which is of very fine quality.

A mine in Utah, which three years ago was considered practically valueless, has since then yielded almost a million dollars in dividends. This is the Mecur mine, and the good results were obtained by using a new process in reducing the ores.

A new mining company, known as the Black Hills Coal and Iron company, has filed articles of incorporation at Rapid City, S. D., with a capital of \$1,500,000.

A rich gold find has been made in the Maryville district, Oregon. In three days from the time work was begun it yielded \$450, and it is estimated that the property is worth at least \$3,000. Four pounds of the ore panned out \$82.

In Saxe Creek district, Oregon, there are 87 mining properties being operated, 15 hydraulic plants and 26 quartz mines. The gold output for the year 1897 is said to be about \$20,000.

News of a rich gold strike comes from the Mikado mine, near Florence, Idaho. This mine is in Baboon gulch, which in early mining days was famous for its placer diggings. At that time a single yard of gravel yielded \$4,500. The Mikado promises to yield a fortune. At the bottom of a 58-foot shaft the ore averaged \$1 per pound. A mill is to be erected in the spring.

As a result of a happy accident three men have struck it rich. They were traveling through Idaho by team, and one of their horses becoming exhausted they were obliged to camp for the night on a mountain top near Boise City. In the morning the attention of one of the men was attracted by some peculiar looking rock near their camp. Actuated by curiosity the men filled a sack with rock and carried it with them to Boise City, where they had it assayed with the result that it was pronounced gold quartz worth \$85 to the ton.

One of the industries that is of comparative recent origin is that of phosphate mining. This product is valuable from an agricultural standpoint, being used as a fertilizer. Before the year 1841 bone dust was the principal commercial fertilizer. At that date guano began to be generally used, but the demand for both it and bone dust was insufficient to supply the demand, and attention was directed toward the phosphate industry in 1867. South Carolina and Florida are the principle producers in the United States, though North Carolina produces some. In 1891 the phosphate output for the world, outside of this country was 830,000 tons. The United States produced 757,133 tons, almost as much as the rest of the world, of which the largest portion was from South Carolina. France produced 400,000 tons for that year and Belgium 200,000.

The Western Mining World, published at Butte, Montana, claims that as regards the mining output Montana is in the lead, producing one-fourth of the entire output, while Colorado comes next. It further claims that the two states together produce almost one-half of the mineral supply of the United States.

Although 1897 was a year of financial depression in this country, the official statistics show that the mineral production was greater than the previous year in everything but silver, which was over two million ounces less than in 1896. The

aggregate value of the mineral production of the United States almost equals that of all Europe, and its gold output for the year past was about even with that of South America. Statistics prove that notwithstanding the great Klondike boom, only \$2,000,000 worth of gold was mined there last year.

Klondike, so report says, has a bonafide ghost, which occupies itself in guarding one of the richest mines on Bonanza Creek. In 1896 two men became partners there in a mine, and one day, while standing near the shaft, they had a slight disagreement, during which one of them fell, or was pushed, into the shaft. The fall killed him. In a short time the other partner was taken sick and died suddenly, and in his last moments raved of having seen the dead man's spirit. Since then several adventurous miners have endeavored to work the mine, but invariably desisted, claiming that they could not stand the unearthly shrieks and noises.

THE OVERLAND ROUTE.

We have to mention Klondike now and then in order to keep up with the procession. Through the kindness of Secretary Woodman we received the pamphlet of the Overland to Klondike via Spokane Route, which contains much information regarding this route, which is claimed to be the "easiest, cheapest, safest."

The route by way of St. Michael's is a round-about one, and he who goes by way of Chilcoot or White Pass will find the crowd very great and the packing charges correspondingly high.

The Spokane route is the overland route by which a man can ride his horse from Spokane to the head waters of the Yukon river, half the distance being over a well-traveled road and the remainder over a trail cut thirty years ago by the Western Union Telegraph Company.

As one entirely unacquainted with any of the routes, and who has no intention of going to the Klondike, the writer is of

course unbiased in the matter, and so can not be accused of prejudice in saying that this route seems a very feasible one and preferable to the others, as it does away with the perils of the sea and the dangers of the pass. In addition to these advantages the route lies through a valley rich in mineral ore and the traveler can "prospect" as he goes.

A. L. Poudrier, Dominion Land Surveyor, has surveyed the Spokane Route and made a very favorable report. A wagon road leads from Spokane to Ashcroft, B. C., and from there to Quesnelle, a distance of 220 miles, is a stage route, a stage making regular weekly trips. From Quesnelle to Telegraph Creek the road is the telegraph trail and from Telegraph Creek to Lake Teslin is another trail, which by spring is expected to be transformed into a good wagon road. Lake Teslin is the head waters of the Yukon river, and from there one may go by boat, the voyage being down stream all the way.

The Spokane route, leads not through a frigid, barren region as is commonly thought, but has quite an equable climate, due to the influence of the Japan current, and it is claimed that until as late as the middle of November, a horse can subsist upon what it can pick up on the road. Food must be carried from that time until April.

Anyone traveling from the east on tourist's or second-class tickets are allowed the privilege of stopping ten days in Spokane to buy supplies.

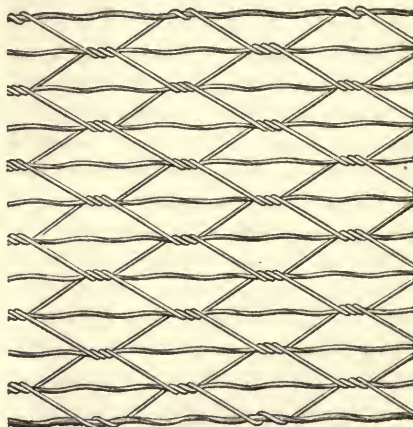
The distance from Spokane to Dawson City is 1689 miles.

Anyone contemplating going to the Klondike can obtain full information regarding the Spokane Overland Route, by writing to the Secretary of the Chamber of Congress, Spokane, Wash.

THE KITSELMAN UP-TO-DATE FENCE.

The fence here shown is made of a high grade of Galvanized Coil Spring Wire with the Duplex Automatic Ball Bearing Woven Wire Fence Machine, which is made en-

tirely of iron and steel, and is so simple and easily operated that anyone who knows how to turn a grindstone can take it right into the field or any place and make 50 to 80 rods a day of the best fence on earth, horse-high, bull-strong, pig, chicken or rabbit-tight at a cost for the wire of only 12 to 20 cents a rod. It can be made in a variety of styles or designs, using either coiled spring, plain or barb wire for the top and bottom margin wires, and by using wire pickets, weaving them right into the fabrics, ornamental designs can be made suitable not only for farm residences but also city and suburban residences. Messrs. Kitselman Bros., Ridgeville, Indiana, whose advertisement appears elsewhere in



this paper, claim the Duplex Automatic Ball Bearing Machine is the result of their ten years' experience in the manufacture of woven wire fence machines and is perfection itself. They also claim to be able to sell a machine and enough wire to make 100 rods of an "Ideal Farm Fence" for less money than 90 rods of any good woven wire farm fence now on the market can be bought for in the roll. In the one case you have the fence only. In the other, you not only have a much better fence for less money but a machine also with which you can do all your fencing thereafter at the actual cost of the wire. Send for their illustrated catalogue which fully describes machine and shows 24 different designs of fence the machine will make.

ODDS AND ENDS.

The following is from a medical journal; no affidavit goes with it and the reader can use his discretion as to believing it: "A young man of Rahway, Pa., whose weight had decreased from 140 to 90 pounds, and who was being treated for consumption, coughed up a live frog three inches long, which is in the possession of the physician, who suspects the presence of other batracians somewhere about the patient." We do not wish to draw odious comparisons, but the above reminds us of the man in the Klondike who cut a hole in the ice to go fishing. He cast in his line and drew up—not a fish on his hook—but a gold nugget worth \$35,000,000.

General Crow, attorney-general of the state of Missouri, gives it as his opinion that the reading of the bible in school and the repetition of the Lord's prayer is contrary to law. He claims that these exercises are forms of religious worship, and as such are forbidden to be done in a public school house during school hours.

FALSE PRETENSES.

Every now and then the heart of the homely girl beats high with hope as she catches sight of a big newspaper heading—"How to be beautiful" or "How to Have a Fine Complexion." At last she sees the long-coveted prize of beauty, within her reach. Beauty—the potent power that has cast its spell over men since the year one. Beauty, what power it gives, to its possessor. For beautiful women empires have rose and fell, battles have been fought, men have become heroes or cowards through her influence, kings or fools; have sacrificed to the beauteous one position, honor, wealth, fame,—everything, even life itself.

And all this power is within the grasp

of the homely girl! With a hand that trembles with hope she clutches the paper and her eager eyes devour the article that is to change her from a round-shouldered, pasty-faced, ungainly creature into a "thing of beauty" that is "a joy forever." And after reading that a graceful figure, a fine complexion of the traditional "peaches and cream" type, sparkling eyes and other attributes of beauty may be possessed by any one who desires them and will take a little trouble, she further learns that it all resolves itself into; "Good health is of course requisite and is the first thing to be considered. Out-door exercise (plenty of it, too) and a simple, healthful diet is necessary." Cleanliness is next mentioned, and then, after struggling through the remainder of the article she is met by the assertion, which in a modified form is generally the closing paragraph of all articles of this nature. "I think our hearts and actions have a great deal to do with our good looks. A selfish, irritable woman can not look beautiful," or in the trite adage that regaled our youthful ears "Pretty is as pretty does." Cold comfort to the searcher after beauty.

The paper is thrown down in disgust and the disappointed maiden thinks there ought to be a law against such an imposition being practiced upon the public. And then she goes to sympathize with the man who has just read a thrilling story of love and adventure, only to learn at the close that if the heroine had taken Dr. Humbug's cure for consumption, she would have lived to become the happy wife of the hero, instead of finding an untimely grave.

L. WING.

According to Gardner's Magazine, there are 28,000 schools in France with gardens

attached to them; and the theory of horticulture is taught in the schools, the practice being obtained in the gardens. This plan is followed to some extent in England, though not extensively. France, however is so well pleased with her schools already established that the French minister of agriculture has decided to increase the number of school gardens and make it imperative that masters of elementary schools in the rural districts must be competent to give practical instruction in the cultivation of the soil.

The death of a boy from eating buttercups caused a medical journal to print the following list of common flowers which are poisonous; wood anemone, daffodils, celandine, narcissus, lily, snowdrop, jonquil, wild hyacinth, monk's hood, fox glove, briony, mezerona, henbane and the night shade.

A beekeeper reported bees that made 125 pounds of honey a year, and when asked how they did it replied, "Oh, that was easy enough; we had the lazy Italian bees and crossed them with lightning bugs, making two swarms; one swarm worked days and the other worked nights."

One of the late novelties, in advertising is the "horse apron." This is worn by the horse and has any printed matter on it that may be desired.

Of, course it was an Indiana man who recently took thirteen liver pills just to show he could. The man died.

It is claimed that Mobile has the worst roads of any in the country. However it is said she intends improving them in the near future.

Experiments have been made in France to determine what effect packing fruit and vegetables in lime would have. It is claimed that by this method tomatoes were preserved in good condition until January and grapes until July.

WHAT JAMES WAS READING.

"James, dear, will you bring me up a scuttle of coal from the cellar?" said a busy wife.

"That's just the way with you," said James, with a frown, as he put down his book, and rose from the arm chair.

"Just the way with me?"

"Yes," he snapped. "As soon as you see me enjoying myself you have something for me to do. Didn't you see I was absorbed in my reading?"

"Well, dear, I will do it myself."

"Yes, and tell everybody—your mother especially—that you have to carry your own coal up from the cellar. No, I'll do it. Let me mark my place."

So he marked the place in the book at which he had ceased reading, and when he went down to the cellar, grumbling all the way, she picked up the volume, and found it was a love story, and that the passage that he had been absorbed in was as follows:

"My darling, when you are my wife I will shield and protect you from every care. The winds of heaven shall not visit your face too roughly; those hands shall never be soiled by menial tasks; your wish shall be my law; your happiness—"

Just then he reappeared, and dropping the scuttle upon the floor, said:

"There's your coal! Give me my book."

—Ex.

Bulm D'way--Well, mum, ye see, it was dis way: Nater made hayin' an' harvest come at a time when it's too hot ter work; an' den she turns right around an' made de time ter saw wood come in de winter when it's too dern cold. Oh! she had it in fer us, mum!

Last year the United States imported \$2,200,000 worth of nuts, many of which were of the kind that might be easily grown in this country. Chestnuts were among them. A chestnut orchard would be a good venture, it seems, for the tree will grow on rough, rocky soil, and the trees are long lived.

LOVE'S YOUNG DREAM.

Father—"Now see here! If you marry that young pauper how on earth are you going to live?"

Sweet Girl—"Oh! we have figured that all out. You remember that old hen my aunt gave me?"

"Yes."

"Well, I have been reading a poultry circular and I find that a good hen will raise twenty chicks in a season. Well, the next season that will be twenty-one hens and, as each will raise twenty more chicks, that will be 420. The next year the number will be 8,400, the following year 168,000 and the next 3,360,000! Just think! At only 50 cents apiece we will then have \$1,680,000. Then, you dear old papa, we'll lend you some money to pay off the mortgage on this house."—*New York Weekly*.

A Cleveland man has invented an electric floor-scrubber, which he claims will do the work in one-fourth of the time required by the old-fashioned method and at a saving of three-fourths of the cost. It is operated by an electric motor which receives its current by means of a cord attached to any convenient incandescent socket, but it is also arranged so that it can be used as a hand machine in case there is no electric current handy. The machine, which weighs about 300 pounds,

is mainly intended for use in large public buildings to scrub halls and corridors. The machines are now in use in some buildings and give quite satisfactory results.

Aqua ammonia is said to be a first-class agent in extinguishing fires. A recent fire occurred in which the vapors of a tank containing fifty gallons of gasoline caught fire, and a druggist, by way of experiment, threw on a gallon and a half of ammonia water, which completely extinguished the flames.

The late Chas. A. Dana was a successful horticulturist. He not only had the knowledge but the means at his command to carry on this study in a practical manner, as his summer home at Dosoris, an island in Long Island sound, bears witness. This island consists of about sixty acres, and on it Mr. Dana had specimens of almost every known shrub or tree that could be grown in the climate. It is asserted that there is no place on earth, of equal size, where so many different varieties of trees and shrubs can be found. His flower and vegetable gardens were as complete. If this garden were only in Greater New York it would be a good investment to have Dosoris preserved in the interests of science as a public botanical garden.



WITH OUR EXCHANGES.

MCCLURE'S MAGAZINE

For March contains an article on the Klondike, by Hamlin Garland, who, the editor's note says, has received his information from head quarters, or in other words from Hon. Clifford Sifton, Canadian Minister of the Interior. The article is called "Ho for Klondike," and in addition to the description of the country and routes, there are numerous illustrations, many of them from photographs, heretofore unpublished, of various points along the way. Possibly few who have made up their minds to go to the Klondike will profit by the advice Mr. Garland gives them, but will press on toward the north to what he calls "a grim and terrible country, and," he continues, "the man who goes there to spend a year is likely to earn with the ache of his bones and the blood of his heart every dollar he finds in gold. He should go like a man enlisting for war."

"Letters From the Andree Party" gives an account of the start by Andree's fellow-voyager, Nils Strindberg, in letters which he wrote to his brother in New York, and there are given also, letters relating to the expedition from Strindberg's father. Another article in a somewhat similar vein is "Where is Andree?" by Walter Wellman.

A good short story is contributed by H. Hobart Nichols, and called "An Experiment in Burglary."

SCRIBNER'S.

Every American citizen should read "The Story of the Revolution" and by so doing gain a knowledge of the war of the revolution and the events leading up to it that can not be obtained from histories, condensed as they are obliged to be. But in this "Story" (which begins in the January issue) Senator Lodge gives the little events that add so much to the interest of

the chronicle, and carries his readers with him from the year 1774 the outbreak of the Revolution, when Mrs. Washington says of her son George "I hope you will all stand firm. I know George will," to the installment in the March number. This tells of the writing of the Declaration of Independence, with a fac simile of the rough draft. In the April number we will have an account of the fight for the Hudson and the battles of Trenton and Princeton.

Under the title "A Pompeian Gentleman's Home-Life," E. Neville-Rolfe gives a description of a house that was recently excavated from the ruins of Pompeii. The illustrations accompanying the article are very fine.

"The Workers.—The West," by Walter A. Wyckoff, begins in this number, and is so vividly written that ones heart aches for the miserable creatures it describes.

Among the good short stories are: "The Madonna That is Childless," by T. R. Sullivan; and "The Frugal Mind," by Marie Frances Upton."

THE FORUM.

In the February number Frank K. Foster contributes an interesting article on "The Condition of the American Working Class: How can it be Benefitted?" in which he takes a very sensible view of the labor question. That he is on the side of the laboring man is clear, but he does not go to the extremes that some friends of labor do, oftentimes doing the cause more harm than good. Mr. Forster says that the present discontent among the laborers of to-day is not a discouraging sign—does not prove that his condition is worse than that of his ancestors, or that the cause is degenerating—but, on the contrary, shows that progress has been made and the laborer has become instead of a mere burden-

bearer a "thinking and responsible social unit." It has become impossible for them "to accept with dull and passive content the lot of their fathers." The author does not desire nor expect ever to see the realization of the Utopian dreams of some reformers who clamor for equality in material possessions, but takes the common sense view of it when he says: "Inequality of material possessions among men is certain to continue as long as some are prudent and others foolish, some grasping and others generous; The dead level of the ideal of Bellamy has little to commend it to the average American." What the laborer of today claims is the right to have things so arranged that his struggle for daily bread need not be performed under conditions that tend to shorten his life, or ruin his health. He wants, not equality of possession, but the chance to earn enough to give him a comfortable liv- and hours to realize that he is a thinking, reasoning being, with desires and aspirations, not an animal or a machine; or as the writer aptly terms it, "In other words, the laborer is a man, claiming a man's share of life; and the question which most directly affect him can be best considered from the standard of manhood rather than that of classhood."

Among the numerous other articles are "The True Meaning of the New Sugar Tariff," by Dr. Harvey W. Wiley; "Whence Come the American Indians;" "Side Lights on Postal Reform," etc.

The March number will contain two articles of especial interest to most farmers. One is "The Tramp Problem," and the other is "Should the United States Produce its Own Sugar," by James Wilson, Secretary of Agriculture; "Our Duty to Cuba" and "The Duty of Annexing Hawaii," are articles that will interest all citizens of this country who keep abreast of the times.

REVIEW OF REVIEWS.

In view of the "war-talk" now going on, the article in the February number, by Frederick Passy, entitled "The Advance

of the Peace Movement Throughout the World" is particularly pertinent. Dealing as it does, with the question of arbitration and legal remedies as a settlement of international disputes, instead of war, the fact that the author is a Frenchman and therefore voices the French idea of this subject, makes it all the more interesting and instructive. W. T. Stead, the well known British journalist, deals with "British Problems and Policies for 1898," under that heading. While claiming as he does to be an optimist, especially regarding Great Britain, he feels that he must chronicle a few facts, even if they are unpalatable to British minds. One is the inadequacy of the standing army for the maintenance of the supremacy of so vast an empire; another is the practical collapse of one of the great political parties, so that the cooperation and rivalry of the two parties that for sixty years has been the basis of good government, can no longer be relied upon. And the third, according to Mr. Stead, is the fact that Great Britain's industrial supremacy is seriously threatened by the United States and Germany.

The "Traveling Library—A Boon for American Country Readers," will be found interesting, especially so to those whom such libraries benefit.

Walter Wellman tells of Arctic Exploration and the Quest of the North Pole," and gives accounts of the five expeditions that are planned for the near future. Lieutenant Perry intends starting in July for a final effort to reach the pole. In July, also Mr. Walter Wellman will make a similar effort, starting from a different point. Three others will also make the attempt.

The usual interesting review of periodicals and leading articles is given.

THE AUSTRALIAN REVIEW OF REVIEWS.

The account of the escape of the Cuban maiden, Evangelina Cisneros, from the prison at Havana, as told in the December magazine under the heading "A Romance of the Pearl of the Antilles," is as thrilling and romantic as any fictitious story of adventure. The second installment is given

in this number of the series of articles entitled "With Stoddard's Team in Australia." Grant Allen's new book "How God revealed Himself to Man;" is given a lengthy review, and the current events of the month in the Australia colonies and in foreign lands, receive the usual attention.

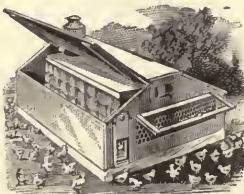
The Louisiana Farmer and Rice Journal, published at Crowley, La., in the interest of the rice industry, is a journal of which the state may be proud. Not only is it neat and up-to-date in its mechanical part, but contains articles of practical benefit to farmers and especially to those engaged in raising rice.

One of the most unique catalogues that has lately come to hand, is the one of J. H. Hale, fruit grower, of South Glastonbury, Conn. It is called "Fruits of Water" and is original in its ideas from cover to cover.

We received this month the 1898 catalogue of D. Hill, of Dundee, Ill., the ever-green specialist. It is very well gotten up, and any one contemplating buying ornamental or fruit trees should send for one of these catalogues. The business has been established for over forty years, which is a good recommendation.

FALSE IMPRESSIONS.

Through both correspondence and direct conversation with the people we have become aware that the fewest number of our people have anything like a proper conception of the worth and magnitude of the poultry industry of this country. It is a fact that no other single industry of our people—with one single exception—produces annually so great an amount of wealth. The receipts from every branch of



RELIABLE OUT-DOOR BROODER.

the industry for the year 1897 amounted in round figures to \$300,000,000.

The advance and increase has been most rapid in the recent past and the industry is now growing at a very rapid rate. Of course, all this increase and growth would not be possible under old conditions, and indeed it has not been so. Shrewd business men and inventors seeing their opportunity and the immensity of the field before them, have perfected many machines and appliances which have made this increase and the profit of the poultry industry possible. Along these lines no body has done more than the Reliable Incubator and Brooder Co., of Quincy, Ill., whose machines we illustrate herewith. They make a complete line of incubators and brooders and other poultry supplies and appliances.

Their machines have been shown in competition with others all over this and other countries and have never suffered de-



feat. Their single policy seems to be to make the best material, with the best workmanship to be sold at a moderate profit. This company also operates one of the largest farms of thoroughbred poultry in country. They keep all standard varieties and sell eggs and poultry in season. Send ten cents and get their new 224 page illustrated catalogue, guide and poultry doctor. It contains information that no man or woman in the poultry business can afford to be without.

A LIBERAL OFFER.

We are authorized by the manufacturer of the "Acme" Pulverizing Harrow, Clod Crusher and Leveler, Millington, N. J., and South Canal street, Chicago (see ad-

vertisement on another page), to say to our subscribers, that this harrow will be sent to any responsible farmer in the United States on trial, to be returned at the expense of the manufacturer if not entirely satisfactory. Mr. Nash asks no money or note in advance, and under these circumstances the farmer certainly runs no risk. We do not hesitate to say that Mr. Nash is a reliable and safe man to deal with.

He delivers harrows free on board at the following points: New York, Chicago, Minneapolis, Columbus, Ohio; Louisville, Ky.; San Francisco, Cal.; and his customers only pay freight from those points.

**GOOD ROADS WILL SAVE YOU
\$4,500,000 ANNUALLY.**

The average cost of moving a ton one mile over our country roads is 25c, and to move a ton ten miles it will cost \$2.00, or 20c per mile, and this does not include the driver's time. The average distance of our farms from their local market or mill is ten miles. The average price of wheat on the farm is 10c less than it is at the local mill or market. This seems to indicate beyond all doubt that the average cost of transporting wheat from the farm to the nearest market is 10c per bushel and this is about 20% of the price of wheat at the average local mill.

Now it costs 10c a bushel to haul this wheat because the roads are poor and if the roads were good the average cost of hauling would be cut in two and thus 10% would be saved to the farmer. This saving would not only apply to wheat, but everything the farmer sells or buys. It is fair to say that the saving made by good roads in a few years would be sufficient to give every farmer an asphalt pavement from his front door to the nearest market.

The total amount of farm products sold in this country annually is about \$3,000,000,000 and the amount of purchases made by the farmer is about \$1,500,000, hence good roads will save 10 per cent on these amounts or \$4,500,000

annually to the American farmer. The best road machines in the world are wide tires. They take the place and render almost unnecessary the road scraper, etc. The narrow tires cut the best roads to pieces in a short time and make the bad roads worse. The wide tires improve and preserve the good roads and make the bad roads into first-class highways.

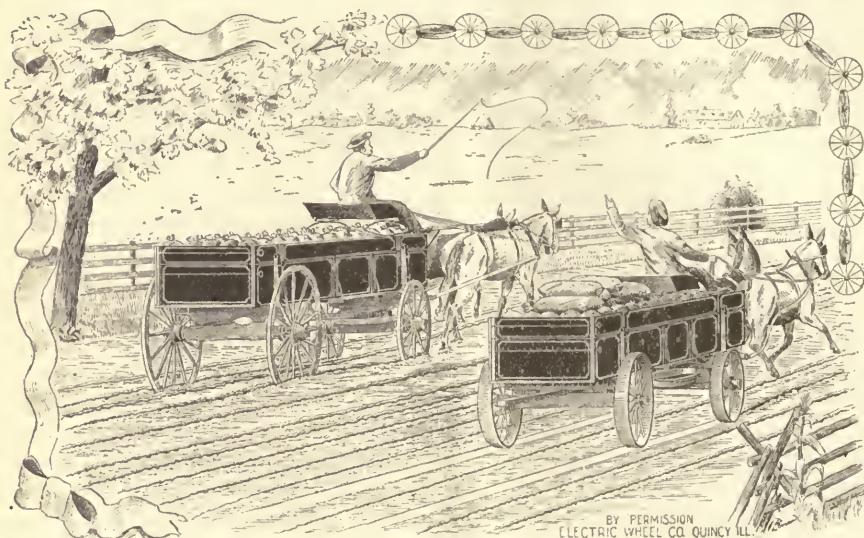
Here is an account of experiments at the Missouri Agricultural College Experimental Station, at Columbia, which practically demonstrates this.

Elaborate tests of the draft of wide and narrow tired wagons have just been completed by the Missouri Agricultural College Experiment Station, Columbia, extending over a period of a year and a half. These tests have been made on macadam, gravel and dirt roads in all conditions, and also on the meadows and plowed fields of the experimental farm. Contrary to public expectation, in nearly all cases draft was materially lighter when tires six inches wide were used, than with tires of standard width. The load hauled was in all cases the same, and the draft was most carefully determined by means of self-recording dynamometer. The beneficial effect of the wide tire on dirt roads is strikingly shown in some recent tests at the station. A clay road, badly cut into ruts by the narrow tires, was selected for the test, as presenting conditions least favorable to the broad tire. A number of tests of the draft of the narrow tire were made in these open ruts, and immediately followed by the broad tires running in the same ruts. The first run of the broad tires over the narrow ruts was accompanied by an increased draft; the second by a draft materially less than the original narrow tire, third by a still greater decline, and in the fourth trip the rut was practically obliterated and filled. In another trial, when a clay road was so badly cut into ruts as to be almost impassable for light vehicles and pleasure carriages, after running the six inch tires over this road twelve times the ruts were completely

filled and a first-class bicycle path made.
—Columbia Herald.

Put wide tires on your wagon. You can buy wheels of steel or wood to fit your wagons with these wide tires at reasonable prices, and the Electric Wheel

Co., of Quincy, Ill., who have kindly loaned the cut shown in this article have a book called "Preservation of Farm Profit," which they send free to any one upon application, which is full of information on this subject.



THE NEWSPAPER AND ITS FRIENDS.

Mildred reads the "Marriages,"

Her interest in them ne'er fails—

Father reads the "Politics,"

And mother reads the "Bargain Sales."

Arthur reads the "Sporting News,"

His special hobby is base ball—

Save the man who reads the proofs,

No one living reads it all.

Bridget reads the "Small ad page,"

Looking for a better place;

Agnes reads the murders, and the

Tales of men in deep disgrace.

Ethel reads the lists of guests

At the big Van Astor ball—

Save the man who reads the proofs,

No one living reads it all.

Sixteen pages every week,

Eight long columns to the page;

To read every line would add

A full twelvemonth to your age,

So each reads his special part,

Then he lets the paper fall.

Pity for him who reads the proofs,

For he has to read it all.

—Somerville Journal.

THE SUBSTITUTE.

BY L. WING.

"Oh, I'm so glad to see you! I thought you were never coming," exclaimed Emma, rushing down the front steps to meet me as I returned from my day's work. I was quite startled at this sudden interest in me, for though we had boarded in the same house for some three weeks, this was the first time she had ever taken any account of my outgoings or incomings. In short, we were merely speaking acquaintances, though Emma had a few weeks before done me a great kindness by sharing her room with me, when I was obliged to give up mine to friends who were visiting me. In thus saving me from a bed on the floor she won my gratitude.

My surprised face questioned her before my tongue had time to act, and Emma hastened to explain:

"You remember the other night when I shared my room with you, and you promised to do me a favor if it were ever in your power?"

"Yes," I answered.

"Well, you can do me a great--a very great favor. Now will you?"

"Certainly, if it is in my power," I replied readily, wondering what it was she wanted and suspicious of being asked for a "loan."

Her next question staggered me, it was so far removed from our previous conversation and so irrelevant to the subject in hand: "Did you ever go riding with a strange young man?"

"Well no," I must confess I never did," said I, rather inclined to resent such a question.

"Well, will you go?" Emma asked, and then went on breathlessly, "You know I have a friend Grace who is perfectly crazy to go round to theatres and places, but never has a chance, because--well, to be frank, because she isn't asked. Well, I thought I'd fix it nice for Grace, so I told her that Mr. McKinzie--You know Mr.

McKinzie, that nice-looking fellow that I go with?"

I nodded.

"Well, I told Mr. McKinzie that the next time he came to take me driving to bring a friend and a double rig and have Grace go. Grace was awfully pleased; to-night was set for our drive (we're going to Lincoln Park), and she was to be here to take supper with me and all start from here. Now it is seven o'clock, and she hasn't come, and at half past seven those two men will call for us, and you can just imagine how good they will feel toward me when they find I'm the only girl going. The other fellow will be mad at McKinzie for bringing him way out here to play gooseberry; McKinzie will just about eat me for suggesting the thing in the first place, and as for me--wait till I see that Grace!"

I felt sorry for Grace, whoever she was.

"Now," continued Emma, "you see what a corner I am in, and as a last straw I cling to you to save me," this last very tragically.

"Why yes, I see you are in a very embarrassing place, but how can I help you out?"

"By taking Grace's place and going with us," was Emma's prompt rejoinder.

"But," I protested, "I don't know either Mr. McKinzie or his friend, and aside from my own feelings, how will that man enjoy having a strange girl palmed off on him for a drive?"

Emma reminded me again and again of my rash promise to aid her if possible, and at length feeling sorry for her, I weakly consented, and the next fifteen minutes were spent in such hurrying around as defies description. By good luck I had had my supper, stopping for it on my way home, and the rapidity with which I got into my "other clothes" was a record-breaker. Our landlady, to whom Emma had previously told her tale of woe, took quite an interest in the affair, and fondly imagined that she helded me dress, though as her "help" consisted chiefly in hanging

away the dress I wanted and bringing out the one I had just put in the closet; sitting in the only chair in my very diminutive bed room and talking without ceasing, I think I could have gladly dispensed with her services. But she meant well.

Promptly at half past seven I repaired to the parlor, breathless and red-faced from my recent haste, and was rewarded by Emma's smile of approval. When I looked at her pretty face and noted her bewitching ways, I did not wonder that the young man found her so charming. She never was obliged to stay at home as was poor Grace, "because she wasn't asked."

We began to listen for the carriage wheels on the paved street. "There they come!" Emma would exclaim time after time as she heard wheels, but on going to the window she would find it to be a late dray or a milk wagon.

Fifteen minutes passed, then a half hour. The mantel clock struck eight in that silvery tone peculiar to mantel clocks and still Mr. McKinzie and friend did not arrive, and I could see that Emma was growing very uneasy.

"It can't be an April fool joke, for this is July," said I at length, not because I thought the remark brilliant, but just to break the deadly stillness that had settled over us.

Ten minutes more passed and for about the fifteenth time that evening Emma exclaimed, "There they are," and ran to the door. This time she was right.

As I put on my hat I asked, "What is the friend's name did you say?"

"Mr. Labree," Emma replied, and added, "come on, it's so late we won't make them come in," so we hastened down the steps and found instead of the double carriage as Emma had told me, two single vehicles. I had no time to say a word. "Mr. McKinzie, Miss Smith, and Mr. Jones, Miss Smith," numbled Emma in hurried introduction. I remembered that Emma had said the "friend's" name was

Labree and behold she introduced him as Jones

Somewhat dazed I allowed Mr. Jones to help me into the carriage and away we drove, behind a horse that I mentally decided was too good to be a livery stable animal.

Conversation between Mr. Jones and Miss Smith languished, as may be supposed. I ventured to make the very brilliant assertion that it was "a fine evening," to which he responded, "yes, if it don't rain." That ended the weather topic and I racked my brain to think of something to say. My companion did not seem disposed to help make conversation and as we drove on in silence I decided that he was disappointed in having me palmed off on him instead of the Grace he expected to meet. This did not tend to make me more talkative, and I'll wager Mr. Jones thought me a stupid person.

Growing desperate at last I began talking rapidly and at random about the different buildings we passed, the drives, and all the other things a person does talk about when he has nothing to say, and knows that no one would care to hear him if he did have. Gradually my companion broke his silence and we conversed in a highly entertaining manner until the park was reached. We had in that time discussed the various high buildings of Chicago, the parks and drives, the smoke nuisance and kindred topics of equally thrilling interest.

At the electric fountain we met Mr. McKinzie and Emma, who, having the slower horse, had been behind us all the way. The conversation then became general, the lights were beautiful and I began to enjoy myself. A drop of rain on my nose warned us that a storm was coming and that as it was growing late we had best start toward home.

As we drove homeward I said in speaking of our drive. "I am taking a new part tonight—that of a substitute." "Yes," Mr. Jones said with the questioning accent that seems to say, "Go on, explain,"

so I continued, "You must have been disappointed when you drove up tonight to see me instead of Grace."

"Grace," still with that puzzled air, "Grace who?"

Sure enough, "Grace who?" I didn't know her last name. "Why, the girl you were to take driving tonight. She didn't come, so Emma persuaded me to come in her place. I'm a substitute."

"You are," he exclaimed laughing, "That's good, so am I."

"Really?"

"Why, yes, didn't you know it? I thought you were disappointed in seeing me instead of the gentleman you expected and that was what made you so quiet."

"How did it happen," said I, wondering if I heard aright.

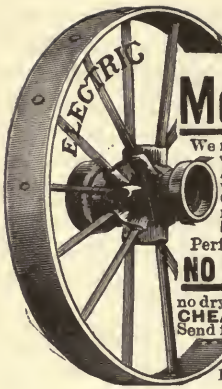
"As near as I can make out, it's like this: McKinzie had agreed to bring some friend with him in a double carriage for Miss Emma and her friend—Grace, I believe you call her—and at the last moment Mac received the cheerful news by telephone that Mr. Whatever-his-name-is couldn't come. The order for the double carriage was countermanded and Mac sat down to swear at his friend and think. What to do he didn't know. There were those two girls waiting for him and go he must, but the thought of the despised 'third party' when two would be company decided him to try and get a substitute

for the faithless gallant. In his dilemma he thought of me. I'm his friend, you know, and what are friends for but to use? So he jumped into his own carriage and drove as if going for a doctor, arriving at my place at half past seven. With tears in his eyes he implored me to bring my own rig and help him out. I felt sorry for his distress and so consented. And here I am a substitute for the 'friend who never came.'"

"Both substitutes," I exclaimed, and then we laughed heartily when we thought of the trouble and worry Emma and Mr. Kinzie had had in getting a substitute to take a substitute, and our homeward drive was a merry one, there being no lack of conversation.

Now I presume you expect me to tell how Mr. Jones called to see me; became a friend and how friendship gradually ripened into love and merry wedding bells rang out. But I shall do nothing of the kind, because they didn't ring. I know that would be the proper ending to a story, but I am nothing if not truthful, and truth compels me to state that before another week had passed, I had left the boarding house -- (not because it was cheaper to move than pay board, but for equally good reasons) and I never saw Mr. Jones again. At least not *that* Mr. Jones.





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Metal Wheel

We make them in all sizes and varieties, **TO FIT ANY AXLE.** Any height, any width of tire you may want. Our wheels are either direct or stagger spoke. Can **FIT YOUR WAGON,**

Perfectly without change....

NO BREAKING DOWN

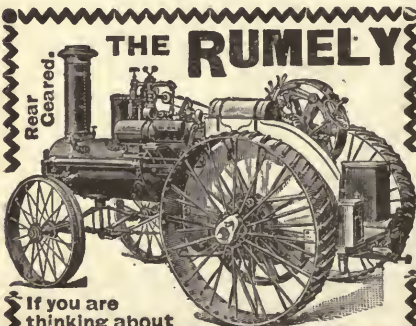
no drying out, no resetting tires **CHEAP** because they endure. Send for catalogue and prices.

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Box 29 Quincy, Illa.

In buying seeds "economy is extravagance," because the cost of cultivation wasted on inferior seeds always largely exceeds the original cost of the best and dearest seeds to be had. The best is always the cheapest. Pay a trifle more for

FERRY'S SEEDS

and always get your money's worth. Five cents per paper everywhere. Always the best. Seed Annual free. **D.M.FERRY & CO., Detroit, Mich.**



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We present "THE NEW RUMELY" which is the climax of 41 year's experience in engine building. Embodying all the best inventions of our own and many others. **IT IS STRONG—SIMPLE—DURABLE AND EASILY OPERATED.** But there is more to it—explained in detail in our new catalogue—**FREE.** **M. RUMELY CO., LAPORTE, IND.**

"ACME" HARROW, CRUSHER, PULVERIZING HARROW, & LEVELER

For all soils, all work. Crushes, cuts, lifts, pulverizes, turns, levels the soil in one operation. Cast steel and wrought iron—**practically indestructible.** Cheapest riding harrow on earth. \$8.00 and up.

To be returned at my expense if not satisfactory. N.B.—I deliver free on board at distributing points.

DUANE H. NASH, Sole M'r., (and 30 So. Canal St., Chicago.

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Illustration pamphlet mailed free. Mention this paper.



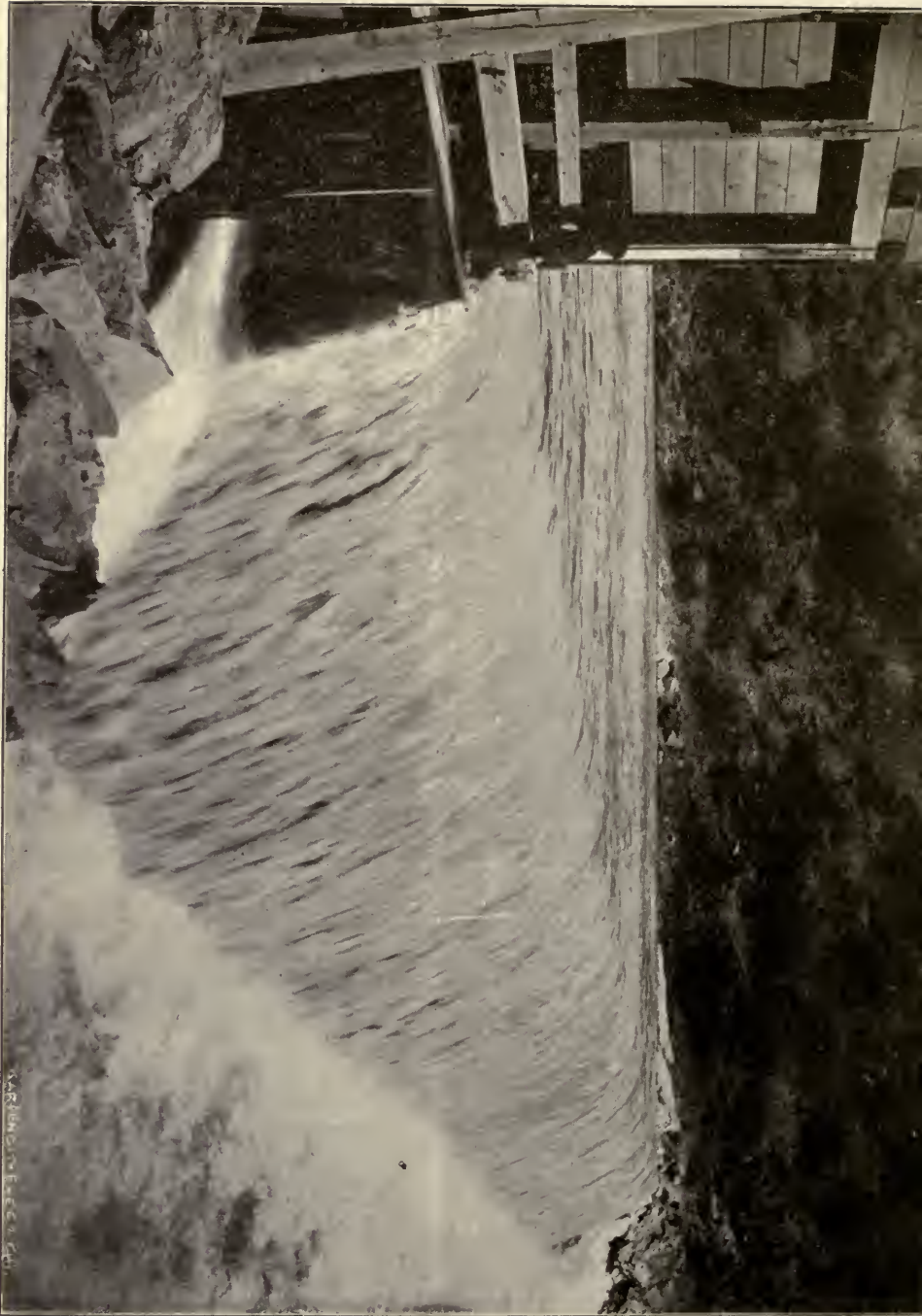
AGENTS WANTED

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WATER SUPPLY. VIEW ON THE AMERICAN RIVER NEAR FAIR OAKS. THE WATER COMES FROM THE MELTING SNOWS OF THE SIERRA
NEVADA MOUNTAIN RANGE.

THE IRRIGATION AGE.

VOL. XII.

CHICAGO, APRIL, 1898.

NO. 7.

THE PROGRESS OF WESTERN AMERICA.

Our War With Spain. One of the greatest drawbacks to Spain in a naval encounter with the United States is the fact that the country has and no coal of its own and no coaling station nearer our shores than the Canary Islands. Torpedo boats are practically useless at any great distance from their supplies as they have no cruising capacity in their coal bunkers. At this time anything of a military nature—statistics or otherwise—is of interest to the people, and this fact led a Washington newspaper correspondent to give the following in regard to the membership of congress.

“Out of a total of ninety men in the United States senate, more than one-third—or thirty-two—are veterans of the civil war, which ended a full generation ago; while two of these thirty-two, who are to-day actively engaged in solving a new war problem, were participants in the struggle with Mexico more than half a century ago. The house, too, despite the lapse of time and the advancement of young men in political life, has a large percentage of men who were active in the rebellion. This is a record of American vigor of which the country may well be proud.”

Irrigation in Various States.

Mr. Joel Shomaker who, in addition to being a journalist and writer, is also a practical farmer, is a contributor to the AGE. With this number he begins the first of a series of articles on western irrigation, this one being

“American Irrigation.” “Irrigation in Utah” will appear in the May issue, and will be followed by others of equal interest. Mr. Shomaker is now making a western trip for the purpose of gaining, from personal observation, an idea of the various methods of irrigation in different sections. Don't fail to read his articles.

A Sign of the Times. At a recent meeting of the bank presidents of Waco, Texas, it was resolved to lend money to the government without interest, in the event of a war with Spain. When we consider that every banker but one had served in the Confederate army, we will get an idea of how united all sections of the Union are in this great National crisis. It has done away with party and sectional lines; there is now “no north, no south, no east, no west,” but all one great nation, united in loyalty and patriotism.

Don't Leave the Farm. David Starr Jordan once said, in speaking of the rush to the cities of the young men from the farm: “Do not go to the city unless you are sure the city needs you. If you go there with nothing to give that the city cares for, you will find yourself cast aside. Brains the city wants and will pay for and devour. Loyalty of service will be recognized and valued in this world or any other. Handwork pure and simple, without skill or pride in it commands no price in the markets. There is no chance about this. The results are as sure as fate. If you do

poor things poorly you will always be poor. What you can do, a bucket of coal and a bucket of water, guided by a thimbleful of brains will do more effectively. When the time shall come that each workman can use his power to the best advantage, we shall have an end to the labor problem."

The young man on the farm looks with longing eyes to the city—it is the Eldorado of his dreams. The memory of men who have gone from the country to the busy cities, there to amass fortunes, haunts him, and the farm grows more and more distasteful. He does not ask, "Have I the ability and brains that he had; am I competent to fight the many obstacles of city life?" No, he simply goes forth with no preparation, with no trade, no profession, no experience, to join the many who are "looking for a job" and who provide the material for Mr. Wyckoff's realistic story "The Workers."

The poor in the country may be miserable, but ah! how vastly more so are the poor in the city! Even though you know their poverty and misfortune may be in a great measure due to their own improvidence or vice, your heart still aches at the hopeless daily struggle of the elders and the dreary future of the children.

And so, unless you are well prepared to fight for your share of the "goods the gods provide" in the city, you had best hesitate ere leaving the country. There, at least, your children may have fresh air, pure water and plenty of sunlight, and the wolf will not howl any fiercer at your door than he will in the city, where these other blessings are denied you.

Our May Number. We expect to publish in the May number of the AGE an address by Dr. Clark Gapen, of Madison, Wis., formerly superintendent of the East Illinois Hospital for the Insane, at Kankakee. Dr. Gapen is well versed in the subject of irrigation and his address will be interesting as well as instructive to our readers.

A Premature Obituary. Now and then we read of a case in which a man is reported dead; his friends grieve and buy mourning, his death notice is published, and then the man turns up, safe and sound, and has an opportunity to read his own obituary. And in passing let us add that most obituaries are calculated to make the victim rise from the dead. But to continue: It has always been a matter of conjecture to us to know how the man felt to find that he had been regarded as dead; whether being "supposed to be dead" he had any hesitancy in making his existence known.

This is a matter of conjecture no longer, for from personal experience we are permitted to speak. We recently read in a Wyoming paper called the "Saratoga Sun" that "The Irrigation Age, which led a rather erratic existence, has at last given up the ghost, and gone the way of all the earth."

Now from its name one would imagine this little sheet to be a bright and shining light in the journalistic world, but if the above item is a sample of the reliability and truthfulness of its "news", we fear its readers are often deluded.

Like the child who closes his eyes and cries "now you can't see me," thinking because you are shut out from his range of vision, he must necessarily be invisible to you, the editor of the Sun has failed to receive the AGE and thereupon concluded that it has "gone the way of all the earth."

No, Mr. Editor, though you may not have seen the AGE it is still alive,—very much so—and though you have ceased to be one of its readers it still manages to struggle on in this "vale of tears", and we are quite confident that the seasons will come and go, the moon wax and wane, many times ere this little notice of yours will be needed.

An old gentleman, whose death notice had appeared by mistake in the columns of the local paper, appealed to the editor to have the report denied in the next week's paper. The editor prided himself

-on never retracting anything that had ever appeared in his paper, and he declined to alter his rule on this occasion, but in order to make it right said:—"While I cannot deny your death, I will next week put your name under the head of 'Births'. Unlike this old gentleman we do not seek redress but will allow time which, it is

said, works wonders, to prove to the Saratoga Sun that the AGE is alive and well, but not "kicking." No, we are not kicking; we hold no grievance against the man who would fain consign us thus prematurely to the world beyond, for after all people are not to blame for what they don't know.

IN THE AVERAGE DRY GOODS STORE.

They stood behind the counter, two rather pretty girls,

With ruffles on their shoulders and very dainty curls;

And oh! their hearts were merry and their tongues were running fast

Of their lovers and their dresses and their pleasures now and past.

When there wandered to the counter with a tired and worried face,

A quiet little woman who asked to look at lace.

One of them looked her over with a cool, contemptuous stare,

Then chatted on: "Oh, Daisy, I wish that you'd been there!"

"I 'spose that Charley looked too cute?"

"You bet that he's alive!"

And my dress was that pink satin that we sold at ninety-five

And I had that woman make it that made that dress for Grace."

"If you please," there came a weary voice, "I want to look at lace."

"And Mary Jenks was there. Oh, girls, you ought to see her hair!

It was curled and frizzed to death--and don't you tell--but I don't care--

I don't believe the half of it grew on her head at all.

And her costoom--well! before I'd wear such a garment to a ball!

And how she ever gets a fellow with that lookin' face!"

"Will you kindly," said a weary voice; "will you let me see some lace?"

"I saw that fellow--you know--that was over in the silks;

He's just too gone for anything on that stuck-up Susy Wilkes.

I never"--here the customer, up-plucking heart of grace,

Spoke boldly: "Please to wait on me. I want to see some lace."

The salesgirl paused such persistence to discover.

"There's only veiling here," she said; "the lace is three rooms over!"

—New York World.

AMERICAN IRRIGATION.

ITS ORIGIN.—AN OLD INDIAN GIVES THE FIRST LESSON IN IRRIGATION TO THE EARLY WESTERN IMMIGRANTS.

JOEL SHOMAKER.

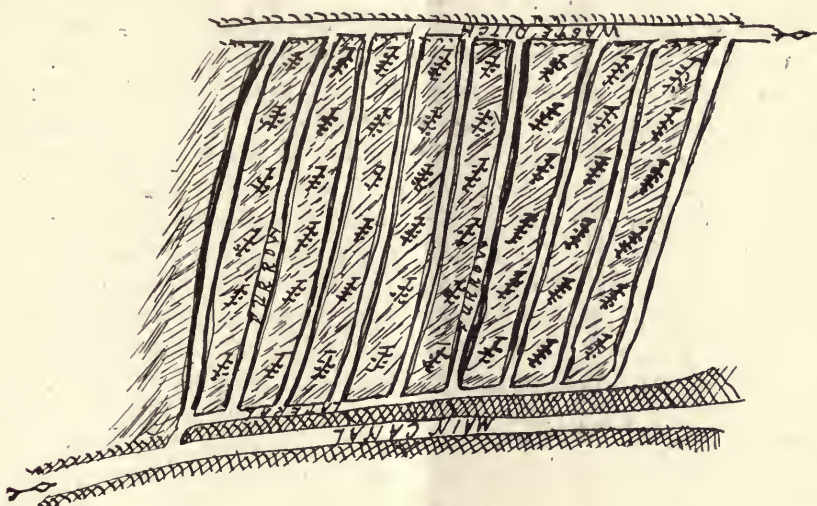
American irrigation passed its first half-century milestone at the close of the year 1897, with the conquest of an area extending over twenty States, and including five million acres reclaimed from the native condition of desert aridity. The dawn of the present year accompanies the sunshine of prosperity to one hundred and twenty-five thousand peaceful farmers residing on the many oases made possible by the science of modern irrigation, controlled by the mind of man. These marvelous changes have been effected at an average cost of less than ten dollars per acre for constructing canals and distributory mains to convey the artificial rain moisture from the mountains of perpetual glaciers to the fields of intensive vegetation. The progress in science, education and public improvements has kept pace with irrigation and the Great West has become the wonder of the closing century.

In 1847 a band of Mormons, under the leadership of Brigham Young, entered the Great American Desert in quest of a suitable location for a modern land of Zion, or a country flowing with milk and honey. The parched and deserted sandy plains exhibited no signs of vegetation and death and desolation claimed complete sovereignty over mountain and plain within a radius of one thousand miles. An old Indian, remembering the legends of his forefathers regarding irrigation, taught these wanderers the system of diverting the flow of mountain streams to the desert, and opened the gateway to the colonization of a wonderfully productive country. The water was turned upon the desert and the seed germs of dormant ages broke forth, causing almost instantaneous vegetation, affording food for man and animals. This discovery gave a key to the unlocking of a tributary country where one hundred million acres could be redeemed from the arid bondage of centuries.

Capital was invested in irrigation canals, of gigantic proportions, and the conquest of arid America followed the golden star of the Pacific coast to the cultivated fields, orchards and vineyards of the trans Mississippi half continent. The expenditures in California for impounding mountain waters and conveying the moisture to vegetation, has reached at least twenty-five million dollars, and the era of reclamation has but fairly begun its conquering march over trackless deserts to comfortable homes of thousands of future owners. This State has thirty-eight irrigation districts, including over one million acres under cultivation, the

canals, reservoirs and wells costing upwards of seventeen million dollars. Utah has the Bear River Canal, representing an outlay of two and a quarter millions, for constructing canal, mains and laterals one hundred and sixty miles in length, to convey water to two hundred and fifty thousand acres. The Pecos Canal, in New Mexico, extends one hundred and twenty-one miles, with mains and laterals completing a system twelve hundred miles in length and capable of furnishing sufficient water for irrigating four hundred thousand acres. Arizona, Colorado, Idaho, Montana and the Dakotas have numerous irrigation canals costing immense sums in construction.

While capitalists have accomplished many things individual colonists could not even attempt, co-operation of farmers has resulted beneficially in developing irrigation enterprises. The Mormons have three hundred and twenty cities, towns, and villages in Utah, and many others in the



surrounding states and territories, where co-operative irrigation canals supply the water for all purposes. These enthusiasts always settle in colonies under the direction of their several church officials, and work upon the plan that labor is the basis of all wealth and money is only a necessary evil. They construct canals, build bridges, make roadways through the mountains and perform all public or colonial labor upon the co-operative principles of an interest in the enterprise and individual honor through community prosperity. The effect of this colonial system has been felt in every state within the realms of irrigation, and farmers co-operative canals are in operation in many sections. By the union of labor and interests canals can be cheaply constructed and easily kept in repair, thereby saving the original first cost of a water right and the annual maintenance fee or rental demanded by corporations. The cost of construction is usually about ten dollars an acre and the co-operative repair fee from fifty cents to one dollar an acre annually.

Individual efforts have enabled many farmers to gain independent water rights by tapping small mountain streams, diverting the flow of springs, constructing small reservoirs, erecting windmills over wells or streams, or by sinking wells to the sheet water of the plains, or the artesian basin of the mountains. When once obtained an independent water supply is more valuable than the land it irrigates, and the farmer has full control of his soil, which by proper cultivation and scientific irrigation, yields all the fertility will produce. Instead of being dependent upon rainfall the farmer with a water supply under his control fully demonstrates the fact that the natural moisture of a humid land is at best but a miserable substitute for irrigation. The water is applied to growing crops at the moment plant life demands sustenance and the growth continues to perfection; being more natural, the plants, cereals and fruits are better flavored, yield more in quantity and are consequently more profitable. The farmer is certain of his annual harvests and does not fear the results of drouths, storms, cyclones or other destructive elements characteristic of the rainland of his fathers. When he contemplates the possibilities of himself in controlling seedtime and harvest he must exclaim: "Man is the monarch of his own kingdom."

Irrigation channels when large enough to carry water for several thousand acres are called canals, and of smaller dimensions are known as ditches, but they are all constructed on the gravity principle, having a fall from one quarter of an inch to six inches or more per rod, the velocity varying with the nature of the soil and height of land where water is delivered. Sometimes a stream may be divided by merely cutting a side channel for a few yards and turning the canal away from the banks, the flow can be taken many miles round the base of a mountain to the land destined for irrigation. In other instances dams are thrown across the streams to raise the water to the bottom of the canals. Where reservoirs are tapped the canals or ditches are generally filled from gates opening near the bottom, and closing when water is not needed. If a mountain stream is used to fill a canal the surplus water entering when a freshet or flood comes from above is disposed of by means of floodgates, or overflow cuts, thus preventing breaks and destruction of crops along the line of canal. Ditches are usually filled by throwing a few stones in the main stream in such a way as to divert enough water to form an independent channel.

Artesian wells furnish large volumes of water for surface irrigation, and more than thirteen thousand of these valuable under current sources have been opened, and are yielding soil moisture at the rate of from ten gallons to five thousand per minute. The water is frequently held in reservoirs and conveyed to the cultivated areas by small canals, when necessary for assisting plant growth. In South Dakota where several hundred wells tap the artesian basin of James River Valley, it is estimated that a flow of four hundred and forty-eight gallons, equivalent to one second foot, in a minute, will supply water for irrigating three hun-

dred and twenty acres—one half section,—or two individual homesteads. The wells vary in depth from twenty feet to several hundred feet and cost an average of about one dollar per foot of depth. Water thus obtained is soft and of a higher temperature than that on the surface and contains more or less mineral substances in solution. Visitors to an artesian field where numerous wells are delivering great volumes of water to the earth's surface make many curious remarks indicative of surprise, ignorance or superstition. One time I was proudly exhibiting the great wells near Salt Lake City to some eastern friends when one remarked: "Well, I declare, if that isn't what I would call robbing the devil to pay the saints."

Water is lifted from underground channels by wind, steam and horse power and stored in reservoirs or run in ditches to the land under cultivation. The windmill is a favorite cheap power especially on the Kansas plains where wind is abundant at all seasons. An ordinary ten foot mill will raise enough water from a depth of fifteen feet to irrigate ten acres of orchard or small fruits. These products are worth from five hundred dollars to fifteen hundred dollars an acre, where scientifically irrigated, when without irrigation the soil would not produce anything but cacti and the sage bush. If a stream flows by an elevated valley too low to admit of a gravity canal the water may be obtained by cutting a tunnel from the stream bed to a well a few hundred feet away, from which it can be lifted by wind, electric, steam or horse power. Those living in the rainbed may think this method very expensive and express pity for the poor irrigation farmer; but, in many instances, a windmill costing one hundred dollars, will deliver water worth ten to twenty times that amount every year.

The proper distribution of water to secure best results in fruit growing and general agriculture requires much careful, studious experimenting, and while one man makes a successful irrigation farmer, many fail because of a lack of knowledge of soil moisture and the quantity of water requisite for a given area. As a general rule all kinds of grain demand artificial irrigation equal to about twenty four inches of rainfall during the season from planting to maturity. This can be given in two to four applications as the soil and climate conditions permit, but many farmers use twice the volume needed and irrigate five to eight times in a season. The grain receiving proper attention and the requisite moisture at the proper time yields double that which is over-irrigated and the quality is much superior. An acre inch or enough water to cover an acre of land one inch deep, applied twenty-four times in the growing season, of five months, is not so valuable as six acre inches put upon the land four times from planting to harvesting. Ten days to three weeks intervals between periods of irrigation, with thorough cultivation produces the most satisfactory results.

Many methods are employed for perfect distribution of water, the successes depending upon the soil, climate, crops and cultivation. In

Florida the best system of irrigating orange groves consists in spraying or creating an artificial rainfall by means of force pumps and hose stretched through the orchards. Some California fruit growers report the best, neatest and most satisfactory method of irrigating trees is by the sub-irrigation or underground plan. This consists in laying pipes on the sub-surface strata and forcing the water through small openings made just under the trees, to percolate through the soil and feed the roots without wetting the surface. In Utah and the Rocky Mountain states the method generally adopted consists in running the water from distribution laterals, through small rills or furrows to a waste ditch thus causing the plowed soil to absorb and distribute the moisture from the surface furrows or ditches. Some farmers and fruit growers conduct the water to the land to be irrigated in wooden flumes or square boxes and allow it to flow out from holes on either side, thereby flooding the entire area as if from a sudden downpour of rain. The Mexicans dig basins round fruit trees and fill with water, leaving it to gradually percolate to the roots and not waste in the vacant spots.

All grains, grasses, vegetables and fruits grow as well under irrigation as in the rainbelt sections, where soil and climate are similar. In western Colorado where a few years ago nothing but venomous reptiles existed, small fruit growers sell over one thousand dollars worth of strawberries and other fruits annually from an acre. Utah gardeners claim from five hundred to fifteen hundred yearly as the product of an acre planted to onions, cauliflower, cabbage, tomatoes, melons or celery while gooseberries and strawberries yield as high as eighteen hundred dollars an acre. The citrus fruits of California pay more handsome profits than delicious fruits or vegetables in the inter-mountain country, due largely to climatic conditions and systematic irrigation. Fifteen years ago the great orange groves of southern California were almost unknown and the shipments were small, because the acreage was limited. By modern irrigation the deserts have been converted into gardens of paradise and the fruit shipments are counted by the number of trainloads, where formerly the reports were given in boxes packed. The results of irrigation in the semi-tropic valleys cannot even be estimated in the millions of dollars.

Alfalfa, a species of California clover, and the most wonderful forage plant of the world, is one of the most prolific products under irrigation, producing two crops in the highest cultivated valleys, and six to eight crops in the lower and semi-tropical climes. This plant withstands drouth and cold to a remarkable extent, yet will receive and digest almost all the water even the extreme irrigationist desires to give. The long tap root extends several feet deep and draws food and moisture from the surface and subsoil keeping green almost throughout the entire year in the coldest climate. With irrigation as a feeder this plant supplies the farmers with food for horses, cattle sheep, swine, poultry and bees, when all other plants fail to return the seed invested. If a farmer

has only enough water to furnish six acre inches he applies it to his alfalfa and cuts three or four tons per acre, besides having abundant pasturage in the early spring and late fall. This peculiar child of irrigation can be watered by furrows, flooding, surface or underground methods and continue to produce abundantly for a half century.

The era of small farms and diversified products has been inaugurated by the introduction of irrigation, because one man cannot cultivate and irrigate successfully more than twenty acres, and he divides the products among the grains, grasses, fruits and vegetables in order to grow all his family and domestic animals require. By intensive soil culture the twenty acre tract yields more profit than under former special cropping of a quarter section. The small farmer is more free and independent of mortgages, middlemen and seductive sharks who live by aiding big farmers to expend their supplies. An American farmer usually irrigates about three acres a day, while the experienced Chinese gardeners attend to ten acres in the same time. Many of the large farmers and fruit growers of the Pacific coast employ Chinamen for irrigating for the reason that they get over more land and do more effective work in a day than their American contemporaries. One of the best known big farmers of California recently admitted to me that while he and all others demanded the exclusion of Chinese, they could not continue the irrigation of large acres without the Mongolians.

Irrigation canal companies sell water rights for from ten dollars to one hundred dollars an acre, with an annual rental of about two dollars an acre for maintenance and distributary fees. The right thus sold is supposed to be a perpetual demand upon the corporation for the amount of water purchased, but does not include the use of any water if the yearly rental charges are not paid according to contract. Sometimes water is sold at a certain price per miner's inch or cubic foot, both measurements being made by means of wires placed in the streams or canals. The inch of measurement is equal to a flow of about thirteen gallons per minute in Colorado, or nine gallons per minute in California. The Colorado inch is ascertained by the volume of water flowing through a square inch hole cut through an inch board, with six inches water pressure in a settling box, while the California inch is the volume passing through an inch square hole, cut through a two inch board, having only four inches pressure above the hole. The second foot equals a flow of one cubic foot or four hundred and forty-eight gallons per minute. An acre foot or sufficient to cover one acre to the depth of twelve inches is forty-three thousand five hundred and sixty cubic feet.

A perfect irrigation system constitutes a surface soil scavenger for carrying away all impurities and poisonous odors from decaying vegetation. Malarial troubles are unknown in the land of irrigation because the spores do not form and cannot exist in the pure atmosphere. The water thoroughly washes the surface depositing the decomposed substances in the waste ditches, from which it is carried to the streams and

borne away, or in case the waste does not return to the streams the soil absorbs all disease germs and emits a healthful ozone to be wafted upon the breeze into the fields and homes of the farmers. In all cultivated areas where irrigation is practiced, the surface soil is filled with channels cut by the water in its rush to the subsoil strata, preventing loggy or sour soil and furnishing a means for self purification in the air chambers beneath the plow point. This effects perfect drainage from the highlands and marshes and leaves no stagnant pools to form miasmatic germs of disease. In the rainbelt the water falling to the surface in occasional showers almost immediately runs away in time worn surface channels to the swamps and lowlands where it assists in the decomposition of vegetation and creating diseased atmosphere.

A SOUTHERN VOLUNTEER.

Yes sir, I fought with Stonewall,
And faced the fight with Lee;
But if this here Union goes to War,
Make one more gun for me!
I didn't shrink from Sherman
As he galloped to the sea;
But if this here Union goes to war,
Make one more gun for me!
I was with 'em at Manassas —
The bully boys in Gray;
I heard the thunderers roarin'
Round Stonewall Jackson's way
And many a time this sword of mine
Has blazed the route for Lee;
But if this old nation goes to war,
Make one more sword for me!
I'm not so full o' fightin',
Nor half so full o' fun
As I was back in the sixties
When I shouldered my old gun;
It may be that my hair is white—
Sich things, you know, must be;
But if this old Union's in for war,
Make one more gun for me!
I hain't forgot my raisin'
Nor how, in sixty-two,
Or thereabouts, with battle shouts
I charged the boys in blue;
And I say; I fought with Stonewall,
And blazed the way for Lee;
But if this old Union's in for war,
Make one more gun for me!

—Atlanta Constitution.

Just make it two, old fellow,
I want to stand once more
Beneath the old flag with you
As in the days of yore,
Our fathers stood together
And fought on land and sea
The battles fierce that made us
A nation of the free.
I whipped you down at Vicksburg,
You licked me at Bull Run;
On many a field we struggled,
When neither victory won,
You wore the gray of southland,
I wore the northern blue;
Like men we did our duty,
When screaming bullets flew.
Four years we fought like devils
But when the war was done
Your hand met mine in friendly clasp,
Our two hearts beat as one.
And now when danger threatens,
No north, no south we know
Once more we stand together
To fight the common foe.
My head, like yours is frosty,
Old age is creeping on;
Life's sun is lower sinking,
My day will soon be gone.
But if our country's honor
Needs once again her son,
I'm ready, too, old fellow,
So get another gun.

—The Redfield, (S. D.) Press.

THE STATUS OF IRRIGATION IN CENTRAL KANSAS.

A. C. ROMIG.

The unsatisfactory result of experimental work by the state board of irrigation; the abortive efforts of individual inexperience; and a betterment in climatic conditions for the seasons of 1896-7 constitute a trinity of cause that has dulled the edge of enthusiasm, and in a measure suspended temporarily the practice of irrigation in Central Kansas.

And in this condition of como we are likely to continue until another period of drouth and another serious crop failure shall emphasize the necessity for artificial aid. The present status is analagous to that of the creamery interests in the latter part of the seventies, and after an abortive effort to establish the industry in the central counties of the state. By reason of incompetent management the experiment was a failure, stock-holders were shy on dividends, and the county condemned as inhospitable and not suited to the business, and in this condition of discredit it remained until the present admirable management brought order out of chaos, success instead of failure, and of the stone rejected of the builders have made the head of, the corner, and the basic foundation for an industry that has become international in its extent and colossal in possibilities. Thus it will be with irrigation. When increased density of population shall dictate small holdings and intense culture, competent experts will take the matter in hand, develop possibilities along the line of irrigation, duplicate the marvelous crops of France, Italy, Holland and Utah and transform this semi-arid country into a region of marvelous production and unfailing yield.

It is not impossible that the necessity for irrigation may be greatly modified by increasing artificially the volume of humidity. For more than twenty years the coast and geoditic department of the national government has been engaged in locating artificial lakes on the upper Mississippi, and in segregating and locating reservoir sites in the mountain districts, more than three hundred of which are located on the water-shed of the Platte, Arkansas, Colorado, Rio Grande and Columbia rivers, ranging from 50 to 7,000 acres each of flooded land, when the dams shall have completed, and if we are correctly informed it is the purpose of the government to extent indefinitely this system of lakes, basins and reservoirs not alone for purposes of irrigation, not alone to avert the disastrous floods of the lower Mississippi by impounding and holding in check the surplus water, nor to secure a better stage for navigation during periods of drouth by the gradual percolation of these same stored waters seeking their natural outlet, but for a betterment in climatic conditions as well. When this stupendous scheme of the Govern-

ment shall culminate in fruition, supplemented and 're-inforced by corporate and syndicate companies and by individual effort in the construction of ponds and basins on the farms throughout the vast drainage basin of the Mississippi and her tributaries, the question of climatic change, of increased humidity, evaporation, dews and rain-fall resolves itself into a self-evident result: And the problem of redemption for the arid West will be conclusively and forever solved.



THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs, Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

MIXED FARMING.

Mixed farming is the best and quickest solution of the problem, how to make the farm pay, which has puzzled the specialist and old time farmer for many years. The strong competition and uncertainty of markets have practically discouraged the wheat farmers and forced them into more diverse productions, as the corn and cotton growers are being compelled to resort to diversified products and the cultivation of smaller areas. When prices are high and crops are good, the sale of one product justifies the specialist in purchasing all other fruits, grains and farm commodities he might easily grow, but poor markets and small yields leave him stranded, at the mercy of all from whom he purchases supplies. The only safe plan lies in growing some of all the soil will produce, and feeding as many sheep, cattle, hogs and poultry as the surrounding conditions will enable the farmer to handle with profit.

In my work as a census enumerator I found one farmer who practiced mixed farming so successfully that he harvested crops to the value of \$9,000 a year from less than fifty acres. He irrigated his land by an independent ditch from a creek which run through the farm, and used all the modern machinery necessary to thoroughly manage all his several products. His animals consisted of 20 horses, 50 cows and

steers, 50 sheep, 30 hogs and a few goats, while 200 fowls divided among the chickens, turkeys, ducks and geese, added to the profit producers of the corral and barnyard. In the orchard, consisting of five acres, one-half being planted to grapes, there were 100 hives of bees. Ten acres were sown to grasses for permanent pasture and a similar area furnished the hay. The cultivated fields were planted to corn, wheat, oats, potatoes, beans and root crops. The stock had free range on the mountains but the sheep, hogs, milch cows, calves and work animals were kept on the farm, summer and winter. He sold the surplus or increase every year and had something for market all the time.

Diversified farming necessitates a certain co-operation of neighbors in purchasing and using farm machinery and marketing the products. A small quantity of any crop cannot be handled profitably except by the combination of several similar products, and therefore mixed farming demands a union of interests in selling. Small farms do not pay for large expenditures in buying implements and machinery, hence four or five neighbors must combine their orders and use the harvester or machines alternately. This brings the farmers in closer business relationship and assists materially in building up better homes, and affords greater facilities for

educating the children. The era of mixed farming has dawned throughout the valleys of the great northwest, and its practice insures more independence for all engaged in modern soil tillage. Something to sell every day in the year is the satisfactory results of mixed farming, and few there are who will object to this change of the farmer's condition.

JOEL SHOMAKER.

A SUBSTITUTE FOR PARIS GREEN.

The Ohio Agricultural Experiment Station has discovered a cheap substitute for Paris green, to use in destroying fruit and vegetable pests. The bulletin issued by the station, gives a detailed account of this substitute, arsenic of soda.

One great objection to Paris green is, that it is expensive; another is that, as it does not dissolve readily, there is a sediment which is liable to be distributed unevenly, some plants receiving so much as to injure the foliage, while others escape altogether.

The arsenite of soda is a rank poison, and as it is a colorless liquid which might easily be mistaken for water, it is rather unsafe to keep any quantity on hand, for fear a mistake might be made. By coloring it with a cheap dye, and labeling it poison, this difficulty would be overcome.

White arsenic, in a soluble form, can be obtained at one-third the price of Paris green, and it dissolves readily.

The following is the method of preparing Arsenite of soda, as given by the Bulletin: "Dissolve two pounds of commercial white arsenic and four pounds of carbonate of soda (washing soda), in two gallons of water, and use one and one-half pints to a barrel of Bordeaux mixture (50 gallons).

The easiest way to make the solution is to put both the white arsenic and carbonate of soda in a gallon of boiling water, and keep boiling about fifteen minutes, or until a clear liquid is formed, and then dilute to two gallons."

The arsenite of soda, as well as Paris green and London purple, is best used in

combination with the Bordeaux mixture for spraying, as the combination does not injure the foliage, while the arsenite of soda alone is apt to burn the leaves. A receipt for making the Bordeaux mixture was given in the January issue of the AGE under the heading "Potato Blight."

PEANUT CULTURE.

Peanuts are small ground peas or nuts, growing on fibers sent out from the vines at the blossoms buds. There are several varieties requiring specific cultivation about the same as corn and sweet potatoes. The large white, generally grown for the market, grow on vines lying close upon the ground like sweet potatoes, and the small white or Spanish, with some of the red varieties, grow on upright vines the same as Irish potatoes. I have grown all kinds, and for home use prefer the small white, while the large is preferable for market. The upright varieties do better if hilled slightly by plow or hoe, and the creeping kinds need a shovelful of earth thrown on the vines to hold them down, so that the nut fibers can enter the soil and form the nuts. The blossoms do not need covering as is generally supposed, and should be left untouched by cultivators or hoes, while the nuts are setting.

A light, dry, sandy soil is best for nut growing, and warm southern slopes are more suitable for successful culture. The vines do not demand much moisture, and about two irrigations are sufficient after the plants begin to bloom. My best crops have been planted in April, though they will mature in moderate climates if planted as late as the first of July. I plant in rows about thirty inches apart, two nuts shelled in a hill, fifteen inches apart in the row. The nuts always do best when shelled, although in very wet seasons may be planted in the hulls. Care must be taken not to crack the thin inside brown covering when shelling, or the nuts may split and not grow. No water should be given until the plants begin to bloom, and then only sparingly. Weeds must be pulled out in the

rows and the ridges or hills not disturbed by hoe or plow. Furrow irrigation I think is best, with the ditches pretty deep so that the water will not flood over the vines.

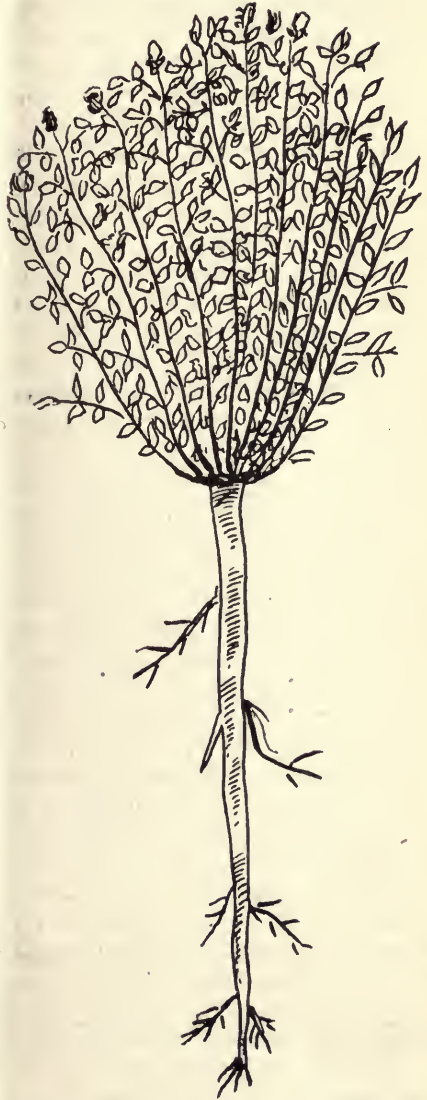
Harvesting is done by pulling or plowing up the vines, or by potato fork. When the vines are dug all the nuts cling to the vines and should be left several days to dry. Two or three rows can be thrown together and left to dry and cure for about two days, when they can be hauled to the barn or stackyard on a hayrack and stacked. The nuts can be picked off by hand at leisure and the vines fed to cows and sheep, making excellent feed. I have grown 80 bushels on an acre under irrigation. A bushel weighs twenty-two pounds and the local or home price has always been 10 cents per pound. An acre at these figures yields \$176, and gives a good profit on the investment. Seed can be purchased by wholesale at about 10 cents per pound in Missouri, Kansas, Indiana, Georgia and elsewhere. The people of the United States consume about \$10,000,000 worth of peanuts every year so that there is no danger from overproduction. Every farmer should plant a few at least for the children, hogs and chickens, and the acreage will certainly be increased with the coming years.

LICORICE ROOT.

A farmer near Phoenix, Arizona, has demonstrated to his entire satisfaction that licorice can be grown in that state. Some years ago he planted a package of licorice seed as an experiment, and so rapid has been the growth of the root that it has not only covered its own territory but threatens to usurp that of the alfalfa field and the garden patch. Some of the roots dug are ten feet long. The owner has made no effort to dispose of the crop beyond sharing it with his neighbors, and his chief efforts now are to get rid of the roots which form a perfect network under the surface. He is through raising licorice root.

THE ALFALFA PLANT.

Alfalfa is a species of Chilian clover introduced in the Rocky mountain country about a quarter of a century ago, from the deserts of South America. The plant withstands drouth and cold to such a re-



markable degree that it is the most valuable green and dry forage grass grown in the realms of irrigation. In the coldest cultivated valleys of the west, two crops of hay can be cut every year from a good field of alfalfa while the warmer sections furn-

ish from three to six crops of hay, with a fair yield of seed. The seed is protected by an oily covering that prevents it from decaying for weeks or months after being sown, even though the climate may be unfavorable for seed germination. A long tap root extends several feet into the ground penetrating the sub-surface strata, in quest of moisture and plant food, making the clover an early and prolific pasture for horses, cattle sheep and hogs. The green leaves are valuable food for all kinds of poultry and make the egg product more profitable when hens are permitted to range in the alfalfa fields.

The seed is usually sown in the spring, on oats or barley, and harrowed in, the same as clover and grass seed, to the depth of an inch or more. If the land is irrigated the seed germinates as soon as other grasses, by the moderate application of water followed by warm weather. The young plants require shade and protection in rising to any height, hence the oat crop is necessary. When the oats are harvested the alfalfa has enough start to continue growing and will do so and get a good stand if not pastured in the fall. In high altitudes the best plan is to let the plants grow the first year and fall over as a mulch for the roots, while in warm soils the crop may be cut in September, to force the strength into the roots, which continue growing all winter, if the ground does not freeze too deep. The alfalfa shoots will show green the first of any crop on the farm in the spring, and must be fenced carefully to prevent the killing of cattle from bloat, especially while the plants are wet or frosted. It is not poisonous as many suppose, but the quantity eaten by hungry animals causes an accumulation of gas in the stomach, and results in death if not soon removed.

Alfalfa hay is almost worthless if allowed to get wet in the swath or winrow, hence it must be cut and stacked as soon as dry. The best plan is to cut one day, rake into winrows and cock in stacks of 200 to 300 pounds, the following day, and haul to the

barn or stackyard the third day from cutting. It should be cut just as the purple blossoms begin to show over the field. If delayed the stalks or stems will be hard and unfit for feed, and if cut too soon, or before the blossoms appear, it will do the animals harm if fed in any quantity. When stacking, the sprinkling of salt at the rate of about fifteen pounds to the ton, will be beneficial and make a more relishable food for horses and cows. Three small poles stood up in the center of the stack in such a manner as to leave a flue for ventilation, will save much hay and keep it in better condition. When the stacks are finished they may be covered with wet straw, wild grass, corn fodder, cloth or other devices used for turning water. In feeding it is advisable to use a hay knife and cut down about three feet at a time, thus preventing the opening of the whole stack.

Alfalfa pasture are the best for milch cows, sheep, hogs and horses, and are relished by calves, poultry and bees if permitted to bloom. Pigs can be turned into alfalfa and left to grow rapidly, without any further attention, if water is plentiful and good wallowing places convenient. Milch cows will not bloat if kept on the alfalfa field, because they never eat it in a ravenous manner, as when taken from the stalls and turned into the green feed. The peculiar odor imparted to milk and butter, by feeding alfalfa alone, may be prevented by giving some dry food, such as bran, grain or timothy hay at milking time. Green alfalfa is not a fattening food, and work horses require something more strengthening, especially in the spring and summer. All animals will keep in good condition in the alfalfa field, but grain must be used to fatten sheep for market and shaping hogs for butchering. The plant is peculiarly arid in its nature but is equally as valuable in the east and the west, the land of irrigation and the country where rainfall is plentiful.

JOEL SHOMAKER.

What is worth doing is worth doing well.

THE SUGAR BEET.

Nothing in the field of agriculture, has received so much attention recently as the sugar beet. Papers and journals devoted to the interests of agriculture have given more or less space to the discussion of this subject, and experiments have been conducted during the past year at the various agricultural stations to study the characteristics and needs of this vegetable.

That the raising of sugar beets is a paying industry under favorable conditions has been demonstrated beyond a doubt in numerous instances. The following is the report made at the beginning of the year by the refinery at Chino, Cal.:—"The Chino beet sugar factory and refinery closed its campaign for the season on Dec. 10, after running day and night since July 17; 98,742 tons of beets were treated and over 25,670,000 pounds of sugar produced. About 350 men have been employed at the factory in day and night shifts and the pay roll has averaged \$22,000 each month since the factory opened, or about \$113,000 for the whole season. The average price paid for beets was \$4 per ton, making the total sum paid to the beet growers \$394,968. The Chino beet sugar factory was built in the midst of a barren cattle ranch in the winter of 1890-91, after the passage of the McKinley tariff law, which put the first bounty on sugar making, and over 11,000 acres of comparatively useless land has been made valuable by the establishment of the industry."

This is one of the many instances that has caused farmers in other sections to investigate the beet. While there are a great many varieties of sugar beet, named from the localities where they were first cultivated or the men who devoted the most care to develop them, probably the best known and most widely raised are the two varieties called the Vilmorin and the Kleinwanzlebener, the latter being the favorite. The former produces from 12 to 16 tons per acre and the latter 14 to 18 tons. The Vilmorin contains more sugar, but the Kleinwanzlebener contains from

13 to 15 per cent. and will grow well in alluvial soils of average richness. California probably takes the lead in the sugar beet industry, but New Mexico is a close second, both having a number of factories in successful operation. In many of the other states the growing of the sugar beet has been carried on merely as an experiment. Nebraska has been very successful in this regard.

From the reports that come from the experiment stations of the different states we learn the following in regard to soil, climate and cultivation:—

First class seed must, of course, be used. Gravelly loam, sandy loam, loam and clay loam are soils that are suited to the beet, but the sandy loam is considered best. Any soil that is well suited to potatoes will do equally well for sugar beets. It is best to plant them after some other crop, not upon new soil, and where the soil deficient in nitrogen, as in arid soils in Arizona, it was found well to plant a crop of alfalfa, clover or cow peas, and the vegetation of these decaying provided the soil with the necessary element for the growth of the beet. The sugar beet is not as some suppose, an exhausting crop to the soil for if the leaves are allowed to remain on the ground and rot, the essential elements are returned to the soil and it suffers no loss. Among the other requirements to success are thorough drainage, so that the sub-soil may be porous, not hard and water soaked, and deep plowing. This latter must be especially emphasized, as the ground must be so loosened and prepared as to allow the beet to bury itself in the soil and send its tap root deep down in search of nourishment.

The beet pulp that is left after the sugar has been removed, is good food for cattle and hogs, making one of the cheapest foods and being well liked by the cattle. Experiments in Nebraska prove that as a food for fattening cattle it is very valuable.

As before remarked, sugar beets may be grown in a number of states, but aside from the suitable climate and soil there is

another thing to be taken into consideration, and that is the factory. To make sugar beet growing profitable to the farmer there must be a factory in his vicinity where he may haul his product. And the site for the factory must combine the advantages of cheap fuel, limestone of unusual purity and an abundant supply of *pure* water. A factory plant of first-class, up-to-date style costs about \$300,000 and the buildings \$100,000, so that to establish a factory requires an outlay of money that is a serious drawback in many cases.

THE JACK RABBIT.

The Jack rabbit is a small, fleet-footed animal found on the plains, in the mountains and throughout the valleys of the west. These pests to the farmers are relished by the Indians as most excellent meat. They are much larger than the brush rabbits of the east, and are more swift in escaping from the dogs. When frightened they will run for several miles before making a halt. Their power of endurance is greater than any animal on the plains and they will live many miles from water or vegetation. In the Indian Jargon they are known as Kwit-shad-ie because of quick jumping and the distance they will travel when alarmed.

In some sections of Utah and Arizona the rabbits destroy all crops. Farmers are compelled to guard their trees and plants day and night to prevent the rabbits from eating everything. On the great desert lying in Nevada and Utah, they travel in droves of thousands. A colony of Kanakas from the Pacific islands settled upon the desert along a stream, in western Utah a few years ago. The Jack Rabbits surrounded them and devoured every particle of vegetation which came to the surface. Clubs, stones and guns were used in defense of the crops, but the rabbits conquered and kept the fields as bare as the sandy plain.

A rabbit fence designed by one of the Maorites, can be seen in the districts in-

festated by rabbits. It consists of willow poles driven in the ground and smaller links woven between. When a man offers his farm for sale, one of the best recommendations is that it is surrounded by a rabbit proof fence. One method of slaying the pests is to drive them into a pasture which is usually surrounded by a pole fence, and then corner them against the willow barricade. They will run towards the water if jumped up late in the afternoon. A dozen or more men armed with breech loading double barrelled shot guns, drive the pests into the trap and shoot as long as a live one is in sight. As many as one thousand have been killed by a few men in one drive.

A Jack rabbit has very long legs and leaps high in the air, hence can travel even though the snow is pretty deep. When two feet of snow is upon the ground, hunters and farmers travel round through the sage brush and grease wood and kill many of their enemies with clubs. Rabbit drives are common pastimes among the young men during the winter months. A crowd of probably two dozen will select two captains, and they in turn will choose men from the best. The two parties will start in, at a certain point, armed with shot guns, and hunt through the brush. A team follows each company and collects the rabbits killed. The party bringing in the fewest rabbits must pay for an oyster supper for both crowds, including their ladies. In these hunts some good marksmen kill over 100 rabbits a day.

Various schemes have been worked in communities where rabbits are not so numerous, to prevent the destruction of fruit trees. A paint made of tar, tobacco, wood ashes and turpentine is sometimes covered over the trunks of small trees to a height of about three feet. This keeps the rabbits away. Old gunny sacks wrapped round the trees prevent the rabbits from gnawing but give the protection to mice which are almost as bad. Screens are made of wire, paste board or other substance, and bent round the trees. Some

farmers make square boxes of half inch lumber and set them round the trunks of their choicest trees. The rabbits frequently manage to get in regardless of all precautions and destroy the trees.

Western commission merchants are besieged every winter with letters from Chicago asking for shipments of rabbits. No attempt has been made yet to create a market except for a few thousand in Salt Lake City, Butte City and other points. Usually the trophies of great hunts are given to the poor. The result of one hunt in which I participated was 1,800 rabbits. After counting the two wagon loads we dumped the game into a frozen slough by the roadside. An enterprising widow living near by had her boys haul the carcasses to her house where she dressed and sold them on the city market for fifteen cents each. The days hunt netted that woman \$270, while we enjoyed our oysters.

An enterprising Chicago firm contemplates the erection of a rabbit meat cannery in Utah, Wyoming or Idaho. The cannery will be constructed on very elaborate plans with a capacity for dressing, cooking and canning several hundred rabbits daily. A fair price will be paid per dozen for the animals. It is calculated that scores of men and boys can be employed by the day, week or month to kill the game. Others will seek a market at so much per dozen, and thus the meat will no doubt become a luxury enjoyed by the wealthiest families of this country and Europe.

It is said that a branch of the Brotherhood of the Co-Operative Commonwealth has been organized at Battle Creek, Mich., it being the first of its kind in the state. A colony has been started in Skagit county, Wash., known as "Equality", named from Bellamy's latest book. Everything is to be owned in common and it is to be hoped that the colonies will be more successful than similar ventures have been in the past.

THE HEN AND HER FRUIT.

The Agricultural College of Utah Experiment Station conducted experiments the past year in the raising of poultry, to determine the relative value of old and young hens, as egg producers; the value of exercise and the value of crossing breeds. Among other features of the experiment were the determining of the annual cost of food per fowl, of the different breeds, the yearly production of eggs per hen and the value of old eggs and fresh eggs for hatching purposes.

Those interested in poultry raising may find their conclusions (given below) to be of value:

There is little profit in keeping hens three and four years old at the market prices of food and eggs in Utah. The profit in feeding young hens, or pullets, was six times greater than in feeding old hens three and four years old. This conclusion does not apply to two-year old hens and hens more than four years old.

Leghorn pullets hatched in April gave better results than those hatched in late May. The profit was about one and a half times greater from the April hatched than from the May hatched.

Of the six pens of fowls, three pens were exercised and three were not. Those exercised produced 26 eggs per fowl more than the other pens, at a food cost of 5.3 cents per dozen eggs against 6.5 cents per dozen eggs in the non-exercised pens. Thus the three exercised pens averaged a profit of 84 cents per fowl during the year, and the unexercised 58 cents per fowl. Exercise had, apparently no influence on the weight of the fowl, neither increasing or decreasing it, but the results of the experiments led to the belief that exercise aids digestion and assimilation of food, and thus prevents a waste of food; 22 per cent less food being required to produce a dozen eggs with exercise than without it.

As to the money in hens, pen 1, representing egg production under the most unfavorable conditions, except as to ration

fed, cleared 2½ cents per fowl during the year on the cost of food. Pen 4, representing egg production under the most favorable conditions, cleared, during the year \$1.26 per fowl; this would have been increased considerably had the eggs laid before the experiment began been counted. In the one case there was a profit on feed of 5 per cent; in the other, 203 per cent.

The percentage of fertility was highest with the early hatched pullets and lowest with the old hens; though the results are not conclusive. The fertility of eggs averaging five days old was 300 per cent higher than of eggs averaging twenty-two days old.

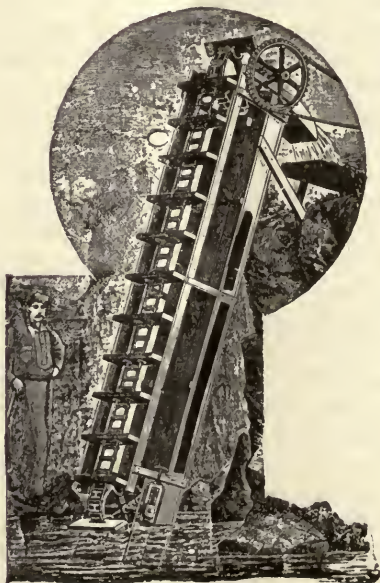
The results noted above were secured from what was considered a good ration fed alike to all pens. Practically the same ration was fed throughout the year. The conclusions, therefore, must not be accepted if a different ration is used.

The results seem to indicate an average

capacity for a Leghorn pullet of 200 eggs per year, with intelligent care and feeding.

No advantage was discovered in crossing the Brahma and Leghorn.

In answer to the question "Is there money in hens?" the Bulletin of the college claims that to give a correct answer you must take the results of fowls under the best possible method. That is, if under the best style of treatment and under favorable conditions, your poultry does not pay, then the question may be truthfully answered in the negative, but it would not be fair to draw your conclusions from poor methods and unfavorable conditions. The ideal pen of the lot, pen 4, at the station, showed that for 62 cents worth of food the pen produced eggs worth \$1.88 per fowl, making a profit on the investment of \$1.26. These results will vary, of course, with the cost of food and price of eggs in different localities.



PULSE OF THE IRRIGATION INDUSTRY.

IRRIGATION IN ILLINOIS.

While irrigation is now acknowledged to be the solution of the problem of "how to reclaim the lands of the West," it has not yet received the favor that it should as a feature in increasing the crop product in humid regions. In other words, while the western farmer looks upon irrigation as his salvation from want, the eastern agriculturist still regards it, in the majority of cases, as a "fad," taken up by "experimental" farmers, upon which they can squander a vast amount of money.

Even in the humid, or rain fall regions, irrigation is beneficial, for there are apt to be periods of droughts that ruin the crops, and a few progressive men have tested the merits of artificial watering in Illinois, Wisconsin and other states, with the best of results, and it is only a question of time when small farms in Illinois and neighboring states will have their irrigating plants.

One of the pioneers in this line of experiment, is Dr. Clarke Gapin, formerly with the Illinois State Insane Asylum at Kankakee, and a gentleman well known to irrigators through his interest and experiments in this connection. At the Fifth National Irrigation Congress, held at Phoenix, Arizona, Dec. 16, 1896, Dr. Gapin gave an address on "Supplemental Irrigation in Humid America," in which were set forth some of the results of his experiments in irrigation, while connected with the institution at Kankakee. This address was published some time ago in the National Advocate, and we are sorry not to be able to quote it all, as it contains much valuable information for the amateur irrigator, who is tackling the subject for the first time.

Regarding the appliances necessary for

raising the water Dr. Gapin says:—"Probably the simplest and most inexpensive of the appliances for raising water is the windmill. A 16-foot windmill connected with a storage reservoir will raise water enough for the irrigation of about ten acres. You will observe that I have said that such a mill must be used in connection with a storage reservoir. The windmill would not have a sufficient capacity to deliver the amount of water needed if the water was wholly used during the time the pumping was going on. A reservoir with a capacity of several million gallons may be constructed at a comparatively small expense, and into this reservoir the windmill pumps throughout the year, filling it up and affording a supply which will be drawn off during the irrigation season. For details of constructing such reservoir see Wilcox's little work on "Irrigation Farming."

Probably, however, the most economical method of delivering water is by means of the centrifugal pump. This pump will raise water to a height not exceeding fifty feet, at a cost of not to exceed 20 to 30 cents per million gallons. These centrifugal pumps are geared or constructed so that they can be operated either by steam or gasoline engines. The operation of the gasoline engine is simpler and somewhat more economical than the operation of a steam engine, but, in my opinion, a steam engine outfit would be more economical to the average farmer or horticulturist, for the reason that it can be used for other purposes at other times of the year; especially can the boiler be used for heating in the winter season and for the operation of machinery. It has always been a matter of surprise to me that the farmer and the

horticulturist make so little use of steam. A small engine can be purchased for \$150, which will not only run his pumping machinery during irrigation, but in the winter season can be used for cutting and grinding feed and innumerable other purposes. With a No. 4 Rotary pump about 600,000 gallons of water per ton of coal was raised by Professor King to a height of 26 feet. If a ton of coal costs not more than \$2 this would be at a rate of .3 of a cent per thousand gallons, or exactly the cost to us at the Hospital.

With reference to piping. In the West wood pipes are much used. They are made both by boring out solid logs of wood, and by banding together staves. If these pipes are well made, and thoroughly painted inside and out with a carbolized filler, they will last a long time in the ground; and the first cost is small, not exceeding 12 to 15 cents per foot for a six inch pipe. The best pipe of course is the cast iron pipe. Cast iron lasts much longer in the soil than either wrought iron or steel. In our work, we use the best grade of cast iron pipe, laid entirely below the frost line, using 3, 4, and 6 inch pipe."

As to the method of applying the water he continues:—"In our work we used only the ditch and flooding methods. In both cases the water was conveyed in large ditches meandering in conformity with the contour of the ground, running oftentimes by very circuitous routes to the points desired. There it was diverted into furrows made by what is called a 'middle breaker,' or double mold board plow, between the rows of corn, potatoes and cabbage, or whatever the crop; or by the flooding method it was spread out over a leveled space, 10 to 15 feet in width, with ridges 6 to 8 inches high thrown up to separate these spaces from each other, and occasional cross ridges if the descent of the ground was too rapid. The slope of the land must be constantly kept in mind, and it is best always to begin at the lowest point and work backwards. In irrigating our orchards, we run a furrow on each side of

each row of trees and allow the water to run slowly through this furrow. Two irrigations are all that are needed in this climate, one early in the spring and the other just as the fruit begins to ripen. When the trees are small we run this furrow close, and farther and farther away as the trees grow larger."

Truck and horticulturing gardening were in Dr. Gapin's opinion, the branches of agriculture in which irrigation could be most profitably used in the humid states, and perfect drainage be considered as important a qualification to success as irrigation.

The crop failure of 1893-'94, by which the institution at Kankakee suffered a great loss, led Dr. Gapin to try irrigation in 1895. One hundred and fifty acres were set aside for garden purposes to supply the institution with vegetables and fruit, and this entire tract was irrigated, ninety and one-half acres being devoted to vegetables alone, which yielded \$6,478.40 or \$71.57 per acre. The vegetables raised were:—Four acres of beets, 15 of cabbage, 3 of cauliflower, three-quarters of an acre of cucumbers, three-quarters of an acre of lettuce, 7 acres of water-melon and musk melon, 3 acres of onions, 5 acres of peas, 3 of radishes, 6 of tomatoes, 15 of turnips, 25 of potatoes, 2 and one-half of greens and one-half acre of rhubarb.

The cost of laying the pipe was about \$10 per acre. The land was newly broken having never before been used for vegetables, and the irrigating was begun late, two drawbacks to the fullest success of the experiment; in spite of which it was a paying investment to the institution.

This will give some slight idea of what may be accomplished by irrigation, even in sections where the rainfall is plentiful.

A south Dakota paper heads its births, marriages and deaths, "Hatched" "Matched" and "Dispatched." The records of the divorce courts would seem to warrant another department headed "Detached."

SOMETHING ABOUT WARD CO., TEXAS.

We have had a number of inquiries regarding crops, climate, irrigation, etc., in Texas, especially Ward Co., and we can answer them in no more satisfactory manner than by quoting from a late issue of the Grand Falls New Era, a bright little paper published at Grand Falls, Ward Co., Texas, upon this same subject:

"We are in receipt of numerous letters asking a great many questions about the country, and we will take this occasion and this space to answer a few of the leading questions.

1. This is a new country, so new that we have not had a full year of farm work yet.

2. Every fruit known to the temperate zone will grow here. We have a great many fruit trees planted, but none are old enough to bear.

3. There is very little land that is open for renting, what there is generally rents for one-third of the crop.

4. American laborers work for a dollar and a half a day, Mexicans get only from seventy-five cents to a dollar.

5. We have the usual game found on the plains, antelope, quail, rabbits, and on the irrigating canals wild ducks by the untold thousands, the Pecos teems with the finest fish.

6. More than a bale of cotton, six tons of sorghum and ten tons of alfalfa have been raised to an acre.

7. No, farming by irrigation is not expensive, not nearly so much so as depending on the rainfall; because, by having an absolute control of the question of moisture we can make maximum crops year after year as certainly as a manufacturer can depend on a given output.

8. It is not excessively hot here as compared with the Northwest, it is never, absolutely never sultry; if you are not in actual work you can always keep cool; the nights are invariably cool, rendering some cover necessary even in summer; sun strokes are unknown.

9. Crimes are unknown, there is not a more orderly community in the world; there are no negroes and no tramps.

10. We have a good school house well attended by children of all ages; Sunday school is held every Sunday, prayer meeting once a week and preaching frequently.

11. Certainly all kinds of stock thrive here. No, we do not have the tick that gives splenetic fever; as an evidence of the healthfulness of our cattle, we are above the quarantine line, both National and State."

BAD PLOWING.

Inferior plowing may be greatly amended by the good harrowing. As a people we are sadly deficient in our farm work. The poor average yield of the crops shows this. But the worst mistake is bad harrowing. This part of the work may be made to cover, if not obviate, many defects of the plowing. It is more easy to harrow than to plow, as the plow must be held and guided by a firm and skillful hand. Even the best plow, if not well handled, may be worthless, but the best harrow from the nature of it cannot be mismanaged, for it works itself if the team only draws it as near straight as may be.

For instance, we take the "Aeme" Pulverizing Harrow, Clod Crusher and Leveler and put a mere boy to drive it, and it will still do its work well. It is made so that its part cannot help but do its work in the manner desired, that is to smooth the inequalities of the surface, crush the clods, and by its special coulters to pulverize the soil, and fit it in the best manner for the seed, and then by a cross harrowing, still further improve the surface while it covers the seed. Then the young plants come up as evenly as if a seed drill had been used. This implement thus saves the cost of a drill.—HENRY STEWART.

"What is a figure of speech, uncle George?" "Well, it is a 90-pound young man asking a 200-pound girl to fly with him."—Chicago Record.

STATE NEWS.

ILLINOIS.

The floods in Southern Illinois are almost equal to the Johnstown horror, in loss of life and property. At Shawneetown it is estimated that at least 500 lives were lost. Relief is being sent by the state for the living and coffins for the dead.

MARYLAND.

Baltimore News. The muskrat season in Dorchester has just closed and the "catch" was 200,000 skins, worth 40,000. The taking of the odoriferous rodents is becoming an important industry in the marsh lands of the county, which, as preserves for the rats, are fast becoming the best-paying pieces of realty in Dorchester. Here we have another illustration of the varied resources of Maryland.

COLORADO.

The Mosco Herald.—"The state papers are commenting on the shipment, a few days ago, of 55,000 bushels of Colorado wheat in one vessel, from Galveston to Europe. They omit to say, however, that the wheat came from the San Luis valley, and that it is only a portion of 300,000 bushels that is being shipped from this noted valley empire in like manner."

UTAH.

All the unallotted lands of the Uncompahge reservation, excepting all lands containing gilsonite, asphalt, elaterite or other mineral substances, were opened for location April 1, under all the land laws of the United States. The mineral lands mentioned shall continue to be reserved.

MONTANA.

Among the many resources of Montana, that of barley growing has received notice. The grain is of such excellent quality that it is being exported to Germany for use in breweries, and brings from \$1.10 to \$1.17 per cwt, more than that from other states.

NEBRASKA.

One of the worst snow storms of the whole season raged at Lincoln and vicinity the last week in March. Street car traffic was greatly interfered with and it is feared that spring wheat and fruit trees may be injured.

CALIFORNIA.

On the 30th of March the western portion of the state experienced one of the severest earthquakes ever known in that vicinity. At San Jose the tremors lasted forty seconds, and it is calculated the earth moved approximately one-fourth of an inch.

KANSAS.

The cattle men of Kansas have formed an organization and held their first convention the last week in March, at Abilene. Officers were elected and a number of papers read pertaining to cattle, transportation and dairy interests.

MINES AND MINING.

A new and feasible scheme for making money on the Yukon has been evolved by a bright Michigan mind. It is proposed to charter a vessel to be used on the Yukon river, and two boats, one of which will contain the necessary machinery consisting of two powerful said pumps, and will also serve as a house-boat, in which the miners can live in all the comfort of civilization. The sand, which is raised by the pumps from the river bed, is to be washed for gold, and as the Alaskan streams are said to be rich in gold, this promises to be a paying venture. Nineteen men from Sault Ste Marie, Mich., have arrived at Tacoma, and their vessel has been chartered. Many of them are musicians and they propose to have a brass band on the house-boat, as one of the antidotes to homesickness.

A queer geological find was recently made by a United States mineral surveyor near the little town of Augusta, Montana.

It was a bed of silicified fossil trees, and indicated that the place had at some former time been the bed of a lake, and that the trees had drifted to the shore. Parts of trees and whole trees were found.

Eugene B. Braden, who has charge of the United States assay office in Helena, Mont., has compiled a table of statistics to show the mining output of Silver Bow County, Mont., from the years 1882 to 1897 inclusive. The output for the fifteen years from the one county was 539,288,164 fine ounces of gold, worth \$11,148,075.74; silver, 113,605,001 ounces, worth \$146,883,234; and 1,875,462,242 pounds of copper, worth \$225,055,467.03; making the total value of the silver, gold and copper \$383,086,777.07.

The district around Tamazula, Mexico, is rich in mineral wealth, but the mines are so inaccessible it takes a vast amount of money to get at them. The Sierra Madres and the gulf cut this region off from the rest of the country and there be-

ing no railroad makes the mines practically valueless.

Onyx in large quantities has been discovered in Laramie County, Wyoming. With very rude implements three men are taking out about three carloads a day.

A mineralogist representing the great German gun firm of Krupp Brothers, has been doing a little prospecting in the vicinity of Salt Lake City, Utah, in the hope of finding traces of a mineral called uranium. This mineral is used to soften the steel while in process of tempering from which their guns are made. The value of the mineral varies from \$300 to \$800 per ton. Another mineral which the representative was in search of is vanadium, which is said to be worth the extraordinary sum of \$4,800 a pound.

Contributions for the international Mining Congress, which is to be held in Salt Lake City, Utah, have been received to the amount of \$1,955.

RECOLLECTION.

How can it be that I forget
The way he phrased my doom,
When I recall the arbesques
That carpeted the room?

How can it be that I forget
His look and mein that hour,
When I recall I wore a rose.
And still can smell the flower?

How can it be that I forget
Those words said at the last,
When I recall the tune a man
Was whistling as he passed?

These things are what we keep from life's
Supremest joy or pain;
For memory locks her chaff in bins
And throws away the grain.

—Anne Reeve Aldrich in *Cosmopolitan*.

WITH OUR EXCHANGES.

THE APRIL FORUM.

The reader must be hard to please who does not find in the April Forum something to suit his taste. Matters commercial, political, musical, and literary, all are duly represented and the list of writers includes none that is not an expert in his own particular sphere. The table of contents is as follows: "The Dangerous Demands of the Interstate Commerce Commission," Milton H. Smith; "England and France in West Africa," Thomas Gibson Bowles, M. P.; "The Political Situation in Europe," Maj-Gen. Nelson A. Miles; "Central America: Its Resources and Commerce," William Eleroy Curtis; "The Economics of Genius," John Mackinnon Robertson; "The Handel Revival in Germany," Prof. Bruno Schrader; "The English Governing Oligarchy," Sidney Low; "Professor Munsterberg's Attack on Experimental Psychology," Prof. Charles B. Bliss; "Is there Work Enough for All?" Hon. William T. Harris; "The Kalevala," Charles Upson Clark; "Recent Histories of Literature," Prof. William P. Trent.

Human wants and desires have come to demand more than the mere necessities for living. Before a complete supply of such necessities is reached, society demands creature comforts and means of luxury. It accordingly sends out its demand for laborers who have greater skill of manipulation and greater power of invention, and invites them to ascend to better-paid industries. These include manufactures that are adapted to luxury and creature comforts and which require a high order of educated, technical skill. This culling out of the higher class of laborers relieves the pressure on the lower orders, wherein machinery displaces the mere hand-laborer. It is obvious all along the line that a new

cycle of employments which add luxury and creature comforts may draw into it the laborers of the lower class as fast as they can be dispensed with below. Suppose that an extreme limit is reached, and that one person out of each hundred of the population is able to supply with the aid of machinery all the raw material that is needed. Suppose again that one person out of each hundred of the people engaged in manufacturing, when aided by machinery is equal to the task of producing all the articles of necessity. Suppose the same in the spheres of transportation and commerce. When once the labor was readjusted it would be found that the ninety-nine laborers out of each hundred could be profitably employed in providing a better quality of clothing, more commodious dwellings, more comfortable furniture, better transportation facilities, and more healthful mills and working-places for the laborer. The entire surplus of laborers could be taken up into this higher order of occupations that increase the means of luxury and comfort for the people.

This readjustment of vocations may be accomplished well enough, provided the laborers are generally intelligent. But this is a very important proviso. The populace must be educated in the common schools and have that superior intelligence which comes from knowledge of the rudiments—reading, writing, arithmetic, geography, industrial drawing, etc. And with education the laborer becomes able to ascend from mere handwork to the supervision and direction of machinery, and to those employments requiring greater skill, which furnish the articles of luxury and creature comfort.—HON. WILLIAM T. HARRIS, in the Forum.

How a workingman can "feed" in Chicago

THE IRRIGATION AGE.

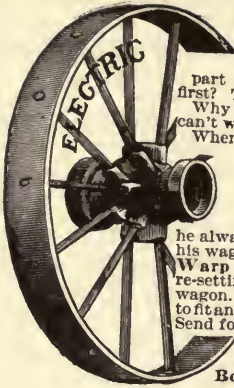
go at from five to fifteen cents per meal is told by Mr. Wyckoff in the April chapter of 'The Workers' in Scribner. He reveals one of the day-laborer's greatest consolations, when he says: "When living is a daily struggle with the problems of what you shall eat and what you shall drink, and where-withal you shall be clothed, and you take no anxious thought for the morrow, quite content to let the morrow take thought for the things of itself, for sufficient unto the day is the evil thereof."

MCCLURE'S MAGAZINE FOR APRIL.

In the way of personal memoirs of the Civil War, there has been nothing more

interesting published than Charles A. Dana's "Reminiscences," and much the most interesting of these thus far is the paper in McClure's Magazine for April, giving Mr. Dana's recollections of Lincoln and his cabinet. Living in the closest official relations with Lincoln and the members of the cabinet for a considerable time, Mr. Dana's opportunities for knowing them were perfect; and he has set forth his impressions of them with that perfect frankness and that sure sense of the central characteristic which make his portraiture so real and definite. The portraits from photographs in the Government Civil War Collection add to the interest of the paper.





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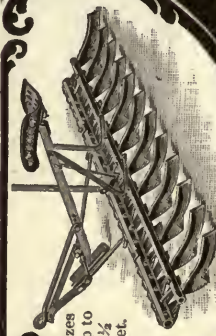
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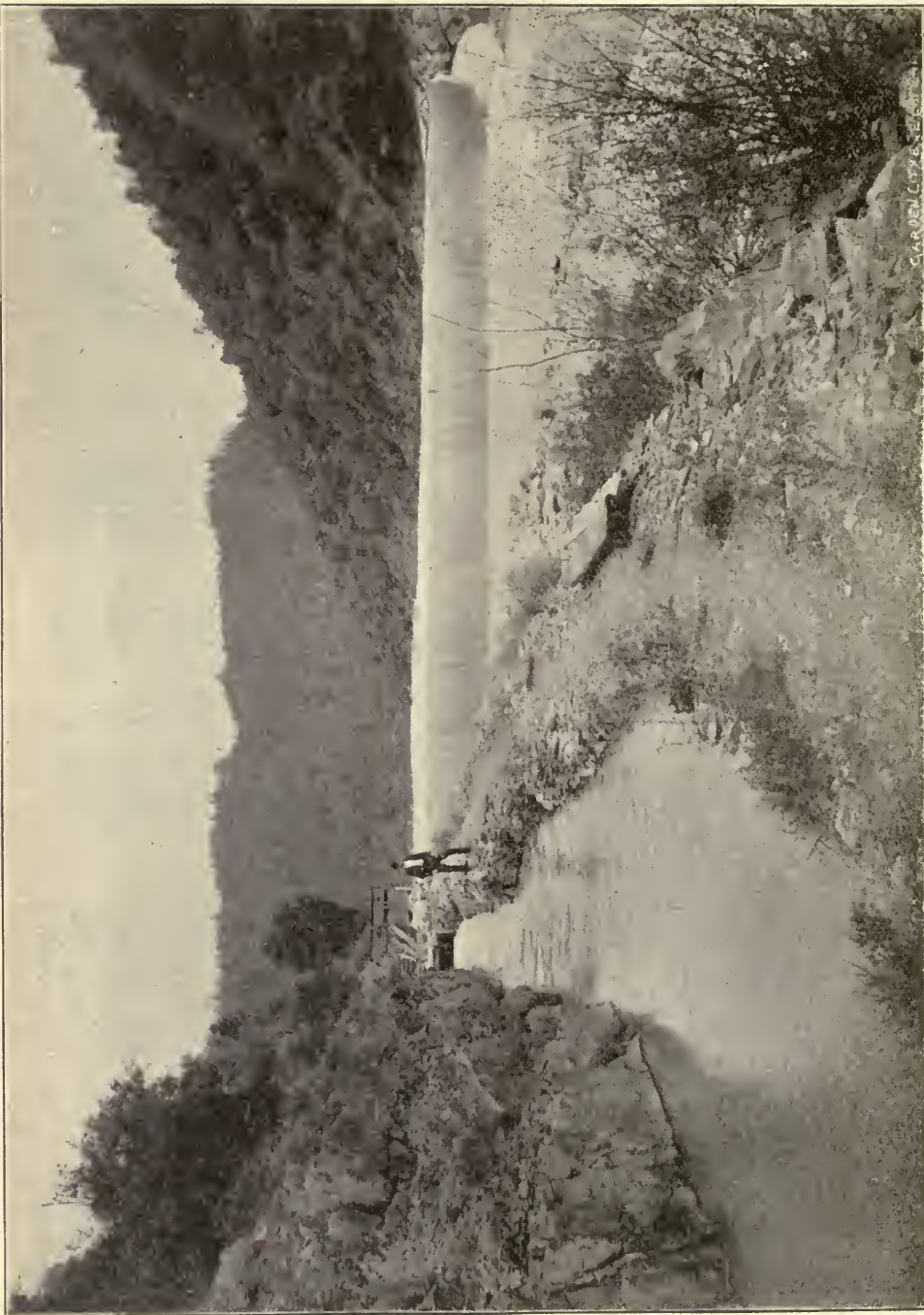
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THE IRRIGATION AGE.

VOL. XII.

CHICAGO, MAY, 1898.

NO. 8.

THE PROGRESS OF WESTERN AMERICA.

Spain's Foreign Trade

Thinking that at the present time our readers may be interested in this subject, we give a few facts relative to Spain's trade with foreign nations, taking the statistics from a bulletin prepared by Frank H. Hitchcock and recently issued by the United States Department of Agriculture.

Spain's commercial transactions with the rest of the world amounts annually to more than \$300,000,000. By comparing the yearly average for 1891-1895 (the last year for which official statistics are obtainable) with that of the preceding five years, it shows a decrease of almost three millions, proving that the general tendency of the trade was toward contraction rather than expansion. Previous to 1891 more than one-half of Spain's maritime commerce was carried by foreign vessels, but since that year there has been a decided gain in the national shipping.

In its foreign trade Spain had her most important dealings with France, the United Kingdom, Cuba, and the United States, 70 per cent. of her foreign commerce during the years 1891-1895 being with these four countries. During these years almost one-half of the merchandise imported into Spain was from France and the United Kingdom, while the United States was third in rank among the sources of Spain's import trade. After the United States Cuba ranked next as an important source of supply.

Although the United States ranked third among the sources of supply, furnishing more than 19 per cent. of the merchandise imported by Spain, it ranked only eighth in list of countries to which Spanish exports were consigned, the annual average of goods sent from Spain to the United States being only 1.88 per cent. of the total shipment to other countries.

Spain was supplied with 75.21 per cent. of her cotton by the United States, for the years 1891-95, and during that time the United States ranked fourth among the countries supplying Spain with wheat. The chief coal supply comes from the United Kingdom, the sugar and coffee from her colonial possessions, and her tobacco from the Phillipines, Cuba and the United States.

Among the principal exports of Spain wine is decidedly the most important, while fruits and nuts hold the second place.

It will be thus seen that our principal exports—cotton and wheat—are of a great deal more importance to Spain than her wine and fruits are to us.

Seeking New Homes

In the early part of April several trainloads of people from various sections of the country passed through Minneapolis on their way to new homes, principally in the west and northwest. Among them was a colony of 57 negroes from Green Co., Ky., who intend

forming a settlement of their own near Fergus Falls, Minn. Six coaches were filled with Dunkards on their way to join their brothers in the faith in North Dakota. Forty freight cars were filled with their household goods. One hundred emigrants were on their way to West Virginia and 150 from Ohio and Indiana were en route for North Dakota where they will settle.

Applicable Now Just at the present time, when press and people seem united in the one aim—to tell the chief executive what to do and how to do it—the advice of Abraham Lincoln, spoken at a similar crisis in national affairs, is worthy of being followed. Lincoln, in his day, was subject to criticism as much as President McKinley is today, and to a delegation who came to the White House to criticise his administration, the former said:

"Gentlemen, suppose all the property you were worth was in gold, and you had put it in the hands of Blondin to carry across the Niagara river on a rope, would you shake the cable or keep shouting out to him, 'Blondin, stand up a little straighter; Blondin, stoop a little more; go' a little faster; lean a little more to the north; lean a little more to the south?' No, you would hold your breath, as well as your tongue, and keep your hands off until he was safe over. The government are carrying an immense weight. Untold treasures are in their hands. They are doing the very best they can. Don't badger them. Keep silence, and we'll get you safe across."

First Steps A gleam of light on the dark pathway of the discouraged farmer and the hopeless city toiler is the interest that is being aroused in the work of reclaiming the arid land of the West. Government aid and supervision of irrigation enterprises means thousands of acres of desert redeemed and made fertile; it means homes for the homeless, hope for the hopeless, aid for the discouraged farmer struggling against disheartening odds. To improve the land we have, to provide for the present population, is better than the acquisition of more territory.

Influential men of the west, senators and representatives, who have the welfare of the common people at heart, are beginning, not only to realize the benefit but to work for the accomplishment of this great aim—the securing of government aid in reclaiming arid land. One of the first steps in this direction was taken March 14, when Representative Newlands introduced a bill into congress, directing the secretary of the interior to make surveys for, and determine and report on the cost of erecting reservoirs in certain rivers and tributaries and appropriating \$250,000 for the purpose. The rivers named are the Sioux, Missouri and Yellowstone, for the benefit of Nebraska, North and South Dakota, Montana and Wyoming; the Columbia and Snake rivers for Oregon, Washington and Idaho; the Platte, Arkansas and Rio Grande for New Mexico and Colorado; the Carson, Walker and Humboldt for Nevada; and Little Colorado, Gila, Salt, Rio Verdi and Puerco for California and Arizona.

Another bill which was presented, appropriated \$21,300 to be spent in collecting data, from agricultural colleges, agricultural experiment stations and other sources, including practical agents and engineers, on the subject of irrigation and for publishing the results in bulletin form.

All of which tends to show that the representatives of the people are at last awakening to the great value of irrigation and the vast importance government aid would be.

Open for Discussion On another page of the AGE will be found an article on "Our Arid Public Lands." Whether the cession of the public lands to the states would offer a chance for land grabbing and monopoly as some have claimed, is still a question. The columns of this journal are open for discussion of this matter, and we would be glad to hear from those both for and against the measure.

A Treat for our Readers An article from the versatile pen of T. S. Van Dyke, will be one of the features of the June issue of the AGE, and will be looked forward to

with eagerness by those of our readers who have previously made the acquaintance of Mr. Van Dyke through his former contributions to the AGE. One of the most brilliant and fluent of writers on irrigation subjects, his books and articles are as interesting as they are instructive and the amateur irrigator will receive from them an education in the art of irrigation, presented in the most attractive form. "Unprofitable Irrigation Works," will be the subject discussed by Mr. Van Dyke, and no one, even remotely interested in irrigation, should fail to read it.

**"Our
Boys in
Blue"**

Another month has passed away—a month of history-making events. The threats and rumors, the reports and contra-reports have given place to the grim voice of war. The first gun has been fired; suspense has given place to certainty and once more the "brave boys in blue" have responded to their country's call. The Land of Sunshine in its May editorial says:

"When the real people of the United States want war—when American women begin to rise up all over the land (the truest patriots of us all, and the bravest) to send their sons and brothers and lovers forth with their God speed; when the decent pulpit cries to the God of Israel to witness the justice of our cause; when the bravest and best of our American men begin to close their business that they may enlist—why then the Lion will be for war. But he has not seen any of these things yet."

Then if the "Lion" hasn't seen these things he must have been asleep in the darkest corner of his "den". For all these things have come to pass. Warriors who have proved their valor on the field of battle; conservative business men who have large interests to leave, have come forward to serve their country; the American women, with many tears, have bid their loved ones good-bye; the pulpits have preached farewell sermons to the regiments as they marched away, commending the justice of their cause. All this, and the "Lion" has not seen it!

**Various
Gatherings**

June will mark the opening of the Trans-Mississippi Exposition at Omaha. A number of conventions are to be held Omaha during the exposition which is to last until October. On June 22—27 the General Federation of Women's Clubs will hold the fourth biennial convention at Denver.

**A Well
Known
Writer**

In our June number we will present an article entitled "The Irrigation District System," written by George H. Maxwell, of San Francisco, Cal. Mr. Maxwell is the editor of the *National Advocate* and also of the *California Advocate*, both of which publications are devoted to the development of irrigation enterprises and the promotion of rural settlement. Therefore he "knows whereof he speaks," and we are more than pleased to present an article to AGE readers from one so well qualified to write on this subject.

IRRIGATION IN UTAH.

THIS STATE THE BIRTHPLACE OF MODERN IRRIGATION IN AMERICA.—WHAT WE OWE TO THE MORMON PIONEERS.

BY JOEL SHOMAKER.

Utah is the mother of modern American irrigation and originator of practical community co-operation. The Mormon pioneers of 1847 constructed the first ditch or canal on the present site of Salt Lake City. They knew nothing of irrigation but were compelled to devise some means for overcoming the aridity prevailing in their chosen valley, and therefore flooded a section of the desert by water taken from the mountain stream near which the city was afterwards erected. The result was marvelous and even by many regarded as miraculous. Vegetation sprang up everywhere that moisture touched the sandy plain and a worthless desert became a veritable grassy paradise. No one attempted to measure the flow of a stream or estimate the duty of water, but simply conveyed it in small furrows to the cultivated area and applied it when the surface seemed dry, allowing it to run until the seepage denoted a perfect meeting of moisture between the rows of grain and potatoes.

The colonists constructed their canals on the co-operative plan, using labor as the basis of all calculation, and issuing shares in ditches in accordance with the work performed. They divided the land, which was all government possessions, into five ten and twenty acre tracts and allotted these areas to men who could cultivate them. Thus a farmer would get the full acreage while a carpenter, blacksmith or other tradesman received the smallest portion. This equalized the water distribution in proportion to the time each man could devote to his tillable land. The city contained ten acre blocks, with a residence on each corner, so that every family could live in the city, grow a garden and small fruits on the lot and cultivate the field as required. One ditch would carry water to many small tracts, hence every man along the line was interested in the construction and maintenance of the ditch and proper distribution of water. A water-master arranged the periods of irrigation and notified each property owner when to take the water and when to cease using it.

With the growth of the territory new fields were conquered by irrigation but the original plan of co-operation was practiced in the settlement of almost every one of the 320 cities, towns and villages in the 27 counties now comprising the state. The original cost of making co-operative farm ditches averaged about \$10 per acre, which was paid in labor, lumber, stone or other material used in ditch building, making dams, flumes or distributory gates. The land was chiefly taken under

the homestead act and the cost of improving varied according to location, uses to which it was put and the plans of the owner. But few Utah farmers live on the farms. They reside in the towns and work their farms, raising grain and potatoes on the cultivated area, and wild hay or alfalfa on the meadows. The exceptions to this rule are chiefly in Weber, Davis, Salt Lake and Utah counties, where market gardening and sugar beet growing are extensively engaged in by the more thrifty farmers. The small farm idea has prevailed everywhere and the average cultivated area of the 20,000 farms now owned, is less than 40 acres, many having all they can handle in a 20 acre tract.

About 85 per cent. of the farms are irrigated, the remainder being cultivated as dry farms, the water coming near the surface and supplying the requisite amount of moisture. Irrigated lands produce from 35 to 50 bushels of wheat per acre while the dry lands seldom average over 25 bushels to the acre. Some farmers have harvested 85 bushels from an acre and Wilford Woodruff, president of the Mormon church, claims to have cultivated his 20 acre farm for 44 years, harvesting no less than 40 bushels of wheat, except one year, and one crop threshed 70 bushels. Wheat is the leading crop of most sections and of the state, followed by potatoes, oats and barley. Alfalfa produces from two to four crops of hay under irrigation, the yield being governed by altitude. The lowest valleys are about 4,000 feet above sea level, while the higher cultivated fields of dairies and potato patches reach 7,000 feet. Rainfall is on the increase and every season adds something to the precipitation of moisture over preceding years, due no doubt to increased cultivation of soil, greater diversion of water and necessarily more evaporation from the earth.

Water rights are known as primary and secondary, the farmer giving the shareholder an interest in the water at all seasons, while the latter merely amounts to a pro rata use of the surplus in early summer and when there is a volume running to waste after the primary claimants have used all they desire. Seven years continuous usage insures a primary right even though the original claim might have been only secondary. An acre water right under the co-operative farmer ditches, when not an appurtenance to the land, usually sells at from \$25 to \$50 varying with the location. The corporations having water for sale charge from \$10 to \$25 an acre for perpetual right, agreeing to deliver enough water for the area to be irrigated during the irrigation season, forever, upon the payment of a rental varying from \$1.00 to \$2.50 per acre annually. The rates vary with the kind of crops grown, thus wheat and alfalfa require less water than small fruits and lawns or gardens and the charges are correspondingly more or less.

Corporation or speculative canals have not proven successful investments in this state for many reasons. The companies furnish only the water at stipulated yearly rentals which must be paid regularly whether the crops yield much or little. New land sometimes shows alkali in such

quantities as to make it worthless, yet the water contracts remain in force and are continual annual demands upon the farmer. The expense of entering upon new government land, grubbing the brush, plowing, fencing and making necessary home improvements is as much as the average home seeker can stand for the first five years, hence the payment of cash for water rights and rentals is almost an impossibility. Those having enough money to meet all the obligations to corporations and at the same time build up a home are usually content to remain where they are, or seek farms that have been developed. If the plans of companies were changed so as to conform to the financial conditions of home seekers their ditches would be more generally used and the income from rentals and sales increase with the prosperity of farmers. Arguments to the contrary are of no avail to the man who wants to make a new home, because his capital consists chiefly in muscle that requires time to develop cash producing fields of grain.

Some farmers have obtained independent water supply by constructing small ditches and appropriating a certain amount of the flow of natural streams, others have reservoirs or springs in the mountain and tap them when water is low, using the streams as public carriers, and taking out their volume, after allowing for seepage and evaporation. In this manner a poor man can secure sufficient water perpetually without the payment of money which he could not get for labor at the time he is engaged in constructing his personal ditch and reservoir or developing the spring. The water costs more by this method than if purchased from a company, if the labor possessed any financial value, but very few men can find remunerative employment in or around the state while trying to develop a farm, and after all, the basis of wealth and independence is the volume of labor and not the amount of cash, the one being in the possession of every man, the other in the hands of a few. By co-operating their efforts and placing labor against labor, many farmers have built home ditches and keep them in repair without the expenditure of money, thus being independent.

Market gardening is practiced to some extent in the vicinity of Salt Lake City and Ogden. The market is found at home and in the mining towns and cities of Montana on the north, and Colorado on the east. These places are reached by the Oregon Short Line and Rio Grande Western railways, the former extending through the state from north to south, the latter from east to west end reaching out by different branches to the more important mining and farming districts. In Davis county the gardeners report the following yields per acre from irrigation: Early cabbage, 12,000 heads, onions 600 bushels, potatoes 350 bushels, tomatoes 2,250 bushels, carrots and parsnips 1,800 bushels, asparagus 5,500 pounds, sweet corn 2,420 dozen, canteloupes 1,814 dozen, watermelons 862 dozen, celery 30,000 stalks, cucumbers 250 bushels, cauliflower 7,260 heads and other things in proportion. An acre of strawberries produces from \$500 to \$1,500 worth of fruit while the gooseberry yields

about 600 bushels. These yields are under intensive cultivation with plenty of irrigation.

Stockraising is one of the leading industries of the state and is a part of the revenue obtained through mixed farming. The cattle, sheep and horses are given free range on the mountains and deserts and, if fed in the winter yield handsome returns for the investment. Many flocks of sheep and droves of cattle feed on the mountains in summer and the valleys in winter without any other care except herding, but the more advanced farmers have found that growing alfalfa and grain and feeding during the coldest months is more profitable. The wool clip alone, amounting to about 15,000,000 pounds, is a great item of cash income enjoyed by hundreds of farmers who own small flocks and lease them to herders for good figures or a part of the wool and increase. The wool is shipped to St. Louis and Boston markets and the mutton sheep to Omaha, Kansas City or Chicago. A good market for farm products always exists where there are numerous bands of cattle or herds of sheep and the owners manage to make one investment create the demand for another.

Sugar beet growing is profitable in Utah county in the vicinity of the sugar factory and this year a large acreage is being planted in Weber to supply the second factory which will be in operation this fall, in time to consume the season's product. The Lehi factory requires 40,000 tons and the Ogden factory will consume as much or more. Good beet land well tilled produces from 15 to 20 tons per acre. The beets sell for \$4.50 a ton and the average cost of producing an acre is about \$30 giving the farmer good profits. With the two factories in operation no less than 6,000 acres will be required to grow sufficient beets for supplying the mills. The beets reach the highest state of perfection under scientific irrigation and the yearly output may be reckoned even before seed time, because such a misfortune as drouth is never known where irrigation is practiced. Beet culture insures clean tillage and is a strong inducement to small land holding and intensive cultivation. Feeding poor beets and pulp from the factory adds to the value of dairying and this industry has taken a strong hold on Utah.

Fruit growing is a much neglected industry which pays well under careful management, and recent years have added several young orchards to the acreage planted. Apples, peaches, pears and the small fruits are the chief orchard plantings, but most of the market supplies come from California. This includes the green, dried and canned fruits and shows the necessity for developing fruit growing and erecting factories for canning and drying. Much good fruit land remains in its original desert condition awaiting the application of water and plow to make it valuable for home builders. The railroads cross many thousands of acres, worth at present only \$1.25, that could be made beautiful orchards and vineyards by colonial co-operation in ditch building. Home seekers can find abundant raw materials in this state that can be manufactured into all the necessities of residence and farm utensils, by skill and an earnest

desire to create a paradise in the desert. The first settlers of Utah were practically penniless and what they have accomplished without capital may be duplicated by others through similar efforts at practical co-operation.

TWO TOILERS.

Two men toiled side by side from sun to
sun,

And both were poor.

Both sat with children when the day was
done,

About the door.

One saw the beautiful in crimson cloud
And shining moon;

The other with his head in sadness bowed,
Made night of noon.

One loved each tree and flower and singing
bird

On mount or plain;

No music in the soul of one was stirred
By leaf or rain.

One saw the good in every fellow man,
And hoped the best;

The other marveled at his Master's plan,
And doubt confessed.

One having heaven above and heaven
below;

Was satisfied;

The other discontented, lived in woe,
And hopeless died

—[Boston Transcript.

AGRICULTURAL PROBLEMS OF THE SEMI-ARID REGIONS.

BY DR. CLARKE GAPEN.

Read before the Sixth National Irrigation Congress, Lincoln, Neb., Sept. 28, 29 and 30th, 1897.

By Semi-Arid regions, roughly speaking, I mean that strip of territory lying between the 95th and 100th meridians and extending from the gulf of Mexico on the south to British America on the north. Its eastern boundary is not defined, but for convenience I have taken the 95th meridian as such. Its western boundary is an irregular line beginning about two degrees west of the 100th meridian on the Rio Grande River, and running slightly north-east across the United States. At its southern extremity the region is something over four hundred miles in width; it narrows down to approximately 300 miles in width in its middle portion, and 250 miles in its northern portion, where it extends but a little west of the Red River of the North. In the eastern half the annual precipitation of water amounts approximately from 30 to 40 inches, and in its western to from 20 to 30 inches, an average of 25 to 35 inches. The rain-fall in the South comes from the Gulf of Mexico, and in the North from the Great Lakes region. The higher temperature of the Gulf region probably accounts for the larger amount of evaporation and consequent wider spread of rain fall.

Probably no territory of similar area on the face of the earth possesses so large a percentage of arable lands. It is almost wholly free from mountainous, marsh or other waste lands. The soil is an alluvium, excellent quality, producing with sufficient moisture enormous crops of cereals, fruits, vegetables, and in the southern portion, cotton and semi-tropical fruits.

Its climate is one of the most salubrious and equable in the world, varying from the semi-tropical to the cold-temperate. A fine, bracing atmosphere, free from fogs, malaria and other forms of germ life, prevails throughout, making the region an exceptionally healthy one and one of the most agreeable to live in on the continent. The death rate is phenomenally low. Yet in this very region, we have seen in the past two or three decades, the struggle for existence and conquest of the soil marked alternately by the flush of success and the sigh of despair.

Among the studies in sociology published by the Johns Hopkins University, is one entitled "The Economic History of a Nebraska Township." In its cold statistical facts one may read the most pathetic stories of success and failure, the holdings steadily increasing during several successive years of sufficient rain-fall, only to fall off again by abandonments or removals as a result of drouth. Of fifteen years' history re-

corded, there were five, irregularly distributed, such as to discourage a large percentage of the settlers. Having personally witnessed some of these years of "the lean and fat kine," I am fully convinced that the agriculturalist of this region only needs to learn to handle it properly to make it one of the most prosperous and one of the most desirable for residence on the continent. I venture therefore to offer a few suggestions. First the farmer must disabuse himself of some mistaken ideas, foremost among which is the extension of the rain line westward. The Government statistical tables, covering a period of over forty years, show extreme irregularity, ranging from 10 to 40 inches, but no increase of the *average* rain fall in any of these regions. Nature has been working a long time on this problem and all the surface indications go to prove that the present conditions have prevailed for ages, and will in the main, continue to do so indefinitely. To appreciably increase rainfall by means of forestry and the culture of vegetation, is the work of centuries rather than of years. There is a region in Norway which was denuded of its forests if I remember correctly, in the twelfth century and which remained semi-arid as a result for two or three centuries, but was reclaimed and the normal rainfall restored by tree planting, in about two hundred years. Unquestionably these agencies accomplish results of value in time, but they are necessarily slow in operation and fixed and limited by the proximity and extent of the original sources of rainfall and the large bodies of water from which the evaporation to supply it takes place—in this instance as I have said—the Gulf of Mexico and the Great Lakes.

The farmer in this region therefore, must learn that he must accept the conditions as he finds them and that first and foremost of these is the fact that rainfall, never excessive, never in fact sufficient to produce a maximum product on this splendid soil, is extremely irregular. Let me read you some statistical facts as to rainfall; for brevity I give merely amounts in two periods of ten successive years: 10.7, 13, 27.8, 17.9, 15.4, 18.1, 33.5, 13.1, 28.5, 30.3 inches; four of ten below 16 inches, six below 20 inches. Fifteen and three tenths, 11.8, 25.8, 18.6, 20, 17.4, 22.9, 17.9, 30, 13 inches; three below 16 inches and six below 20 inches.

A second important fact is that the precipitation of moisture occurs very irregularly in different portions of the year. e. g. the fall and winter months may receive a large part of the precipitation and only a small amount falling during the growing period of the cereals.

Having briefly outlined the facts with which we have to deal in the semi-arid region, I offer as briefly some suggestions as to methods of utilizing these fertile and delightful prairies.

First and foremost always of course, irrigation where possible. Learn the money value of water and you will become interested in its preservation and utilization. Mark Twain, in two interesting stories, humorously points out and illustrates values in relation to certain localities. In one, a story of the Black Forest, the wealthiest citizen is he

who possesses the largest pile of manure; in another, a story of Esquimaux life, it is fish-hooks. In London it is gold. The farmer in the arid or semi arid regions, will by and by learn that with him it is water. Then he will conserve and use water with higher skill and intelligence. There is no region in which, little as he may think of it, water is not of supreme value to the agriculturist, nor where by increasing its supply to the soil during the growing season, he may not only make certain his crop, but vastly increase the amount and value of his product. I have dwelt, however, so fully upon this topic in my paper on Supplemental Irrigation, before this body at its last meeting, that I pass it now with the mere statement that irrigation will pay and pay well anywhere, even in the best of the so-called humid regions. How much more essential therefore where rainfall is uncertain or irregular.

It is a fact worth noting that much valuable moisture precipitates during the fall, winter and spring months when it cannot be utilized ordinarily. Is there not some crop with which we can utilize this? I owe a valuable lesson in this to Mr. J. W. Orr, one of your delegates and former member of the Board of Trustees at Kankakee, where most of my work in agriculture and dairying was done. He suggested the sowing of rye on corn ground immediately on the removal of the corn; not with any intention of growing a rye crop, but for use as a fall and winter pasture, and as a fertilizing mulch when ploughing under in the spring. I was immensely pleased with the result as will any one be who tries it. Let enough rye mature each year to furnish seed for the next fall's sowing.

It will be seen from the figures given that roughly speaking as an average in the region mentioned about three-tenths of the years may be termed unfruitful. This varies much as I am aware from east to west, the ratio being more favorable in the most eastern portions where it is less, than in the western portions where it is more. I have struck what I believe is a fair average on a full crop basis. In other words, we will say that the farmer is constantly in danger, (as he is in varying degree in nearly all other regions) of losing his crop or having it reduced in amount below his reasonable expectations. But the average fruitfulness stands the same from year to year. Now is there not some means by which he can adjust his consumption to the *average fruitfulness* rather than to one which is fitful and irregular in the extreme? I answer yes, and suggest the use of the silo and that he engage more largely in stock raising, dairying, etc. I am hardly telling any one here anything new when I speak of the silo. I am merely making a plea for its more extended use and on behalf of its peculiar adaptability to the region in question. The silo is merely a kind of house in which, and a method by which forage plants may be preserved in a green and succulent state for an indefinite period. I know of one silo, and have myself constructed one, from which ensilage was taken after three years storage and was found to be juicy, sweet and nutritious. The Germans have used

methods similar to the silo for over a century, but the modern use originated about 1870 in France. It was introduced into this country about 1875 and has been in use in New York, Ohio, Michigan, Wisconsin, Northern Iowa and Illinois for several years. I am aware that it has its opponents as well as its advocates, but practical experience has placed me with the latter. I fully believe want of success with it means slovenly construction and unintelligent use. By its aid the farmer in the semi arid region may distribute the use of his crop so that his *consumption* will be the same from year to year, though his production may be very uneven. Ensilage may be made from grasses, clover, alfalfa, oats, rye and even from some varieties of succulent weeds; but the best is made from a growthy sweet corn. Let us take as an illustration a farmer who has 160 acres in this semi-arid region. He builds silos with a capacity of two thousand tons and plants eighty acres to ensilage corn. Starting with a full crop year he is easily able to fill his silos at a cost of less than one dollar per ton. Remembering that he has ten years feeding to seven years production, he calculates that seven years crop of 2000 tons each makes 14,000 tons of product and dividing by the ten years of use he ascertain that he can safely feed out 1,400 tons each year and can provide himself with stock accordingly.

The cost of the silo is about \$1.00 to \$1.25 per ton of storage capacity. I believe it would pay the railroads to haul lumber for the construction of silos free.

Having given the construction of silos and the making and use of ensilage somewhat extended study, I may be pardoned for a few words on these points, though fuller information can be obtained from the agricultural departments of each state, to whose bulletins I refer you. The two all important and essential desiderata in construction is that the silo shall be air tight and water tight. An ideal silo would be located on high ground, circular in form, built of brick, with an interspace of one inch or less between walls, filled in with a mixture of one part coal tar and four parts cheapest grade of rosin; the bottom of asphalt. Of course the first cost of such a silo as this would be great and I am not expecting any one to build such, though in the long run it would be cheap. I merely use this as an illustration of what I would regard a perfect silo,

Let me describe briefly a 600 ton silo, the latest of my own construction, cost \$800, circular in form, height 38 feet, diameter 30 feet, height of foundation wall 8 feet, of which 6 was below the surface on one side to bring it on a level with basement of barn; superstructure of wood, 30 feet height; frame 2x4 inches pine. Outside of framework tarred paper, one thickness, then half inch boards, then tarred paper, then $\frac{3}{4}$ inch siding, painted. Inside of framework tarred paper, then half inch boards, then tarred paper, then half inch boards, then lath and cement plaster; grouting and cement bottom. It is well to paint all wood work with a carbolized filler which can be obtained for about 30 cents a gallon. The durability of the wood work is much increased thereby.

The best ensilage, I have said, is made from sweet corn taken from the field while the leaves and stocks are yet green and while the ear is yet in the milk. This cut in pieces $\frac{1}{4}$ to $\frac{1}{2}$ inch in length by an ensilage cutter, is filled into the silo at the top by an elevating attachment to the cutter and evenly distributed over the silo and well tramped and packed down. You will hear much of weighting and covering the top of the silo when full. If you do not wish to use it at once it is well to cover the top with hay and weight, but we did nothing of the sort; we began to use from the silo the next day after it was filled and relied upon the height of the mass to subject the under portions to sufficient pressure. The process through which the ensilage goes is the following: We have a mass of living vegetable cells packed closely together with but a small amount of oxygen present. Oxygen is absorbed and carbonic acid is evolved. Starch is converted into sugar; out of part of the sugar then is evolved by the acid ferments present, acetic, lactic and butyric acids. Heat is evolved; when the temperature rises above 122° F. fermentation is arrested. If it rises above 150° F. vegetable cells are destroyed. Corn too nearly ripened is likely to cause this result by evolving too much heat. When all the oxygen is used sugars remain and the result is so called sweet ensilage. When too much water is present there is an excess of acid fermentation and the result is sour ensilage (analogous to sauerkraut). Both varieties are eaten freely by stock and they thrive on both. The sweet is better for milk. Very readily assimilable and nutritious peptones are evolved out of the nitrogenous elements of the corn. Ensilage is a wholesome and nutritious food for cattle. It is succulent and digestible. It is cheap. The milk from cows fed upon it is of good quality and taste. Cattle thrive well upon it and a larger number of cattle may be supported upon a given area than in any other way. I reduced a pasture range for three hundred cows from four hundred to a little more than 100 acres by its use. It makes an excellent summer feed. I have seen stock come in from grass up to their eyes and eat ensilage greedily. The farmer need have no fear of his stock running down in dry seasons for want of grass if he has ensilage.

Its cost in Illinois is about \$1.00 per ton. It ought not to cost more than half or three-fourths that in Nebraska or Kansas. The cost of the silo is about \$1.25 per ton of storage capacity.

I believe it would pay the railroads to haul lumber for silos free in the semi-arid regions.

THE DIVERSIFIED FARM.

'In diversified farming by irrigation lies the salvation of agriculture.'

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs, Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

DIVERSIFIED AGRICULTURE.

When I was a boy in northern Kentucky my folks thought the only profitable farm crop was tobacco, and our friends down the Mississippi said cotton was king. A few years later, as a young man, I resided in central Illinois where the farmers claimed corn as the only real money-making product of soil culture. In my present locality, a high mountain valley, 7,000 feet above sea level, I am informed that wheat is the money crop and it is useless to plant any other cereal for profit. But a varied experience on different farms, and practical observation of farming in twenty states of the South and West, has proven to me that the only profitable way to handle the farm, applicable to all classes of farmers, is to diversify the products. In no community where the farmers are devoted to any special product, have I noticed that independence and prosperity characteristic of the small, well-tilled and diversified farms, managed by the modern farmers who always have something to sell from the barn, stackyard, meat-house, granery or cellar. I have learned that while cotton may be king and corn queen, they require the assistance of the many field, garden and orchard products, with the animals and fowls of the barnyard to complete the royal cash-producing family of the farm.

In my work as a census enumerator in 1890, I found a man who owned 57 acres, ten of which were not tillable, and from that small farm he had an income of about \$9,000 a year. He had five acres in orchard and small fruits, the yield averaging over \$500 an acre yearly. The three acres of grapes, as his books showed, returned \$1,650 the third year after planting. In the orchard were 105 stands of bees, producing 5,000 pounds of marketable honey every year. The barnyard contained 300 fowls, divided among the chickens, ducks, geese and turkeys, every one of which, I know by experience, returns one dollar yearly to the owner. He had 20 or more milch cows in the yard and pasture, raising calves and supplying milk for making marketable butter and cheese. An ordinary cow will pay for her feed and yield a profit of at least \$3.00 per month, and a good one will give a profit of \$50 a year, so that this farmer lost nothing on his horned stock. His hay meadow yielded 75 tons and about three tons of alfalfa seed, while the fields gave good returns of corn, beans, peas, pumpkins and root crops. He had several sheep, hogs and horses, the increase being sold once a year, leaving the original number on the farm. The farm was situated in a low, hot, sandy valley, which produce sweet potatoes, peanuts and fruits, but not wheat, oats or potatoes.

One year I divided a ten-acre cornfield into small plats and planted the crops suitable to the soil and climate. Peanuts yielded 80 bushels, white navy beans, 50 bushels; sweet potatoes, 250 bushels; bunch lima beans, 40 bushels; pop corn, 40 bushels; and field corn, 60 bushels to the acre. The several crops were all saleable every day in the year and kept safely until the market was demanding my products, when I sold at a good cash price. I made ten times the money from that acreage I could have gotten from corn alone, besides having an abundance of each for family use without purchasing. This was in a warm valley where root crops, Kaffir corn, melons, pumpkins, fruits and vegetables grew profusely, while the poultry, hogs, cattle, bees and horses could be added to the farm dividend payers. In a cold valley or special wheat country, a friend grows oats, barley, corn, wheat, potatoes, fruits and vegetables, with farm animals and poultry, and makes a profit from each. He kills from 20 to 40 hogs every year, smokes the meat and sells for cash the following season. The surplus from other sources is sold when the market is right, and this man gets about \$5,000 every year from 40 acres.

If I were planting a farm in the South or Southwest this spring, and was confronted with the question of how to make it profitable, I would study the markets and diversify the products. I would plow the land as early as possible, and if it did not contain much sand, would turn it at least eight inches in depth; if sandy soil, four inches would be better. After plowing I would thoroughly pulverize with a disc harrow, and level by dragging a log over the field, if I had no better tool. On good corn land I would plant some corn, an acre or more of beans, white navy or Lima, a similar acre in peanuts or sweet potatoes, a good patch of popcorn, an acre in carrots, turnips, rutabagas and mangels, and whatever the market demanded in cabbage, onions, tomatoes and cucumbers. If I

had hogs and cattle I would plant an abundance of pumpkins and squashes, and Kaffir or Jerusalem corn for the chickens, ducks, geese and turkeys. I would plant as close as the soil would justify and furrow out both ways so that everything could be cross cultivated with small shovels or tooth cultivators, and keep stirring the soil, especially after every rain. If necessary to hire help I would pay the highest wages and employ the best and most experienced persons.

Irrigation may seem unnecessary, and some Southern farmers no doubt think it an attempt to substitute the power of man for the natural rainfall, but I should most certainly prepare for irrigating every cultivated acre, so that moisture could be supplied when required for growing or maturing crops. The expense of an irrigation system is very small where springs, creeks, ponds and wells can be utilized, and the income from mixed farming can surely be made more certain, and in many instances doubled, by irrigating at the proper time. In the hot, dry months of July and August a small stream of water divided into furrows and distributed over a field for even one night would save enough to pay for the land in one season. The small fruits, if within 12 hours' express delivery of a large city, are worth several hundred dollars an acre when the plants and the trees produce to the full capacity; and this cannot be done without an abundance of natural rain or artificial irrigation. Trees and plants may be sprayed or sprinkled after sunset with perfect safety in any climate and the fruits saved from destruction by drouth. My plan, then, for making the farm more profitable, when fully condensed is: properly prepare the land; plant all the crops suitable to the soil and climate, that can be marketed; cultivate thoroughly and, if necessary, supply the requisite moisture by systematic irrigation.

JOEL SHOMAKER.

MACHINE FOR RAISING WATER.

[The following description of the machine, together with the illustrations, was sent us by the inventor of the device, Mr. Albert J. Boyce, of Augusta, O. T.—E.D.]

tionary post to which it is journaled. The outer ends of the timbers are supported by wheels. On this frame an upright post is securely braced, having a swivel at the top end, to which the ropes are attached high



This machine is to be operated by animal power. The power frame is con-

enough to allow the team to pass under the same. This post is placed at a distance



structed by bolting two timbers together in a V-shape; this frame is supported at the conjunction of the timbers by a sta-

from the center post equal to one-half the height of lift.

The bucket in which the water is raised

is hung between two ropes which are attached almost midway between the top and bottom of the same. These ropes pass through pulleys situated directly over the supply of water, and are attached to the swivel before mentioned. These ropes are long enough to reach the water and allow the bucket to fill when the post with the swivel is nearest the water supply, and upon the frame being drawn to the opposite side of the circle, will raise the bucket to the desired height, and upon returning to the starting point the bucket will descend.

This bucket may be constructed so it will fill at the open end, or, in case of wells, may be provided with a valve in the bottom, through which the water will find its way. The bucket is provided with a projection at the open end which engages with a cross-piece when it reaches the delivery point and causes the bucket to tip to one side, emptying the water into a swaying receiving box which moves forward automatically each time the bucket is emptied.

Water can be drawn from any number of wells at one and the same operation, and the size of the bucket is only limited by the quantity of water desired and the power applied.

One photo shows the complete machine operating one 40-inch well, raising 200 gallons of water per minute, while the other picture shows the water as it flows from the receiving box.

WESTERN FRUIT PESTS.

A few years ago Utah fruits were in demand and considered equal in quality with the products of any section where irrigation was practiced. That was in the days when orchards and vineyards were young and required but little attention. A change has come over the fruit industry, and foreign fruits fill the demands of much of the Utah market. The reason for this is that the trees and vines are neglected and their various enemies have taken possession of many enclosures that once produced excellent fruits. What is true of Utah is applicable to some of the older settled districts of other Western

States. The codlin moth, tree bor. rs, leaf blight, water rot and other diseases are destroying the trees.

I have experimented in various ways with fruit trees and vines, and have discovered that they require constant care and attention in order to make fruit-growing a profitable business. Rabbits gnaw the young trees, insects attack the roots, too much water kills the trunks, and unless properly planned and cultivated they are many years old before bearing and do not produce good fruits. The atmosphere of the West is very dry and conducive to twig blight, dry rot and impoverished leaves. On account of but little rain the leaf mites, caterpillars, moth and all insects, clinging to the branches or fruits, are undisturbed in their work of destruction. Over-irrigation of the roots checks the growth and weakens the trees so that pests can easily sap out their vitality.

The most effective remedy against rabbits is to surround the trees with a screen made from wire netting, thin boards, gunny sacks or similar devices. A preparation of equal parts of linseed oil and lime, mixed to a thin paste, and put upon the trees usually keeps the rabbits away. Some fruit men report that rubbing the small trees, late in the fall, with a greased rag will be sufficient to prevent the rabbits from gnawing. Another method is to mix some soap and red pepper in whitewash and paint the trunks of the trees as high up as the rabbits can reach. If a little green hay is distributed through the orchard in the winter the rabbits will eat that and leave the trees. This costs but little, as 500 pounds will be sufficient for 40 acres orchard.

Thorough cultivation and correct moisture at the roots of the trees will insure a thrifty growth which prevents the insects from doing so much damage. The cultivation between the rows should be for beets, mangels or other root crops, because corn or grain is not generally cultivated, but left to grow up in weeds. Any crop will do, so long as the ground is well stirred

and kept clean of weeds. Over-irrigation or too much rain can be remedied by drainage, or using dynamite beneath the roots, to break up the soil. Drains may be cut through the orchard at proper angles, and deep enough to draw away the stagnant pools of water that collect round the roots and on the subsoil strata. If this is done the trees will make such a vigorous growth the first year as to surprise the owner.

Cleanliness is one of the first and most necessary preventions of fruit pests. The leaves, dead limbs, old fruits and bark should be cleaned up and burned early in the spring. It is well to leave everything on the ground through the winter as it serves well for mulching and becomes the habitation of dormant pests. If raked up and burned in the spring the trash will uncover the hiding places of spiders, worms and bugs, and many of them will be burned. Hay or straw left lying about the trunks of the trees will make a safe retreat for field mice that destroy many young trees and plants. Old, well rotted manure may be piled around the trees, providing it does not contain coarse straw or corn-stalks. The liquid fertilization is beneficial and feeds the tree roots, making them more thrifty.

Spraying is absolutely necessary if a good crop of perfect fruit is expected. In addition to killing the moths, worms, lice and mites, and destroying fungus diseases the spraying acts as a fertilizer for the foliage. I have used a solution of lime and vitriol, one pound each, and Paris green, one-fourth pound, mixed in forty gallons of water, for the early insects. This is applied to the trunks and branches around the roots of the trees immediately after the leaves are raked and burned. For ap-

ple borers, a paste made of two pounds of lime, one pound of soap, one pint of lye and one pint of tar is an excellent remedy. After the blossoms have dropped I have used a quarter of a pound of Paris Green with a pint of flour, mixed in 40 gallons of water. This ought to be kept up, at intervals of 10 days, until the fruits are half grown. I use the proportion for all fruits except peaches and pears, when I add soft soap and kerosene in the ratio of about one part of the emulsion to 15 parts of water.

JOEL SHOMAKER.

Cotton exporters from the cotton belt of Arkansas, Texas and Louisiana are shipping their product from the eastern ports instead of from New Orleans, as has been the custom. Since September 1, 1892, 579 bales of cotton have been shipped through St. Louis, while last year, during the same period, 391,925 bales only were shipped. The change in shipping ports is due to the war with Spain.

Anyone wishing to grow ferns should take them up when the fronds begin to appear, as this is the best time for transplanting.

Latest reports from the South put the estimate of the cotton crop new being marketed at about 11,500,000 bales, which is by far the largest ever produced, and four times as large as that of the year 1872.

The report of the Department of Agriculture for March 1st makes farm reserves as follows: Wheat. 121,000,000 bushels; corn, 783,000,000 bushels.

PULSE OF THE IRRIGATION INDUSTRY.

MONTANA SOCIETY OF ENGINEERS.

A meeting of the society was held in Helena, on April 12, 1898, Second Vice President F. J. Smith presiding. Mr. William Trautwine Shaw, of Gilt Edge, Mont., was elected a member of the society. The application for membership by Mr. F. W. Sherman, manager of the Gold Mountain Mining company, at Bernice, Mont., was favorably considered and the secretary instructed to send out the usual letter ballots. A committee of three, F. L. Sizer, Paul S. A. Bickel and A. E. Cumming, all of Helena, was appointed to consider the question of taking action and co-operating with other states interested in securing a grant of arid lands to be used for the purpose of irrigation developments.

The next regular meeting of the Society will be held in its rooms in the Merchants' National bank building, Helena, Mont., on May 14, 1898, at 8 p. m.

A. S. HOVEY, Secretary.

THE BENEFITS OF IRRIGATION.

If anything were needed to emphasize the benefits of irrigation the recent drouth in California would serve as an illustration. A half inch more of rain would have been the guarantee of a good sugar beet crop, but rain cannot be depended upon and the crop will therefore be seriously affected.

The Pecos Valley, N. M., another sugar beet growing section, gives the opposite view, or the result of depending upon irrigation instead of an uncertain rainfall. It has a very complete irrigation system.

The Pecos Valley Argus in commenting upon the California drouth says:

"With adequate irrigation facilities, California would be placed above the plane of chance as regards a beet crop, and just

in this particular the Pecos Valley claims superiority.

Its climatic and soil conditions are equal to those of any beet growing district, while in addition it has the inestimable advantage of a most complete irrigation system. No seasons of dearth here due to drouth. No anxious moments for the farmer as to whether or not the longed-for rain is to come. The water flows through his field; he directs it where he wills and the crop springs up.

Here he prepares the ground, plants seed and prepares for a beet crop without thought as to whether the season will be wet or dry. In other districts, without the protection of irrigation, the grower must time his work to the condition of the seasons, be they favorable or unfavorable, and if, perchance, it be one of extreme dryness, see the months of summer slip by without it being possible by exertion on his part to work out accomplishment."

OUR ARID PUBLIC LANDS.

The Helena *Independent*, of April 14, contains the following: "The Montana Society of Engineers has been asked to interest itself in an effort about to be made with a view to securing large grants of arid lands to the Rocky Mountain States from the general government. The movement originated in Wyoming, where the desirability of state control of arid grazing lands is even more apparent than in Montana."

At a recent meeting of the society in Helena, the question was laid before the engineers by James M. Page; of Twin Bridges, president of the society, whose attention had been called to the plan by Elwood Mead, State Engineer of Wyoming. In a letter relative to this En-

gineer Mead wrote that the State Engineers of Utah, Colorado, Nebraska, Kansas and Wyoming had held a meeting for the purpose of "considering measures for the better determination of our opportunities for irrigation development and the promotion of that development. It was concluded to unite in asking a grant of 5,000,000 acres of grazing land to each of the arid states, this land to be rented and the proceeds to be applied to irrigation investigation and development. The idea was taken from a memorial to our representatives in Congress, prepared by the Wyoming State Board of Control last season."

Mr. Meade writes further: "The view of the state engineers is that each state has its own water laws and the development of the state's resources is a local rather than a general affair, and that instead of the government making appropriations, the state ought to be placed in a position to carry on this work. The people who are to administer the water laws ought to be the ones to investigate the conditions which those laws are to control."

The memorial referred to by Engineer Mead was prepared by the Wyoming State Board of Control. It is urged that the conditions represented in it apply to Montana as well as Wyoming. In part the memorial reads:

"To enable the state to inaugurate needed reforms in our land laws and carry out the beneficent provisions of our water laws, we respectfully solicit your aid in securing from the general government a grant of 5,000,000 acres of grazing land, to be given to the state in trust, in aid of irrigation, the title to remain perpetually in the state, the land to be leased to farmers and resident stockmen, and the revenue arising therefrom to constitute a trust fund to be expended by the state to pay the expenses of the state administration of its water laws and to aid in the location and construction of irrigation works of too great cost for private enterprise.

The reports of the United States geo-

logical survey show that 54,000,000 acres of this state's surface are public grazing lands. These are now an open common. There is no law for their management or disposal, nor attempt made to protect these pastures from overstocking, and the consequent destruction of the native grasses which give them their sole productive value. On the contrary, every condition favors and makes inevitable this unfortunate result. This is not a matter of conjecture, but of experience. The lessened growth of grasses in Wyoming and the other arid states, the enormous losses which have been sustained by the range industries through overstocking and insufficient winter pasturage, leaves no possible doubt as to the result of a continuance of present conditions. The destruction of free timber on the mountains is not more certain than that of free grass on the plains.

This work should be done under state supervision, by the authority which controls the appropriations of streams and supervises their distribution and use. It cannot be done, however, unless the state receives some aid from the national government. A state government which has to maintain civil order over an area larger than New England, of which less than 10 per cent contributes anything to its support in either rentals or taxes, cannot provide the funds for this work. The best possible method of doing this is through the donation of land asked for by your petitioners.

We believe that Wyoming is entitled to this grant as a measure of justice; that the state was discriminated against in the extent and value of the lands granted to it in the act of admission, and that the treatment of many of her sister states was much more liberal. Sixteen states received grants of 500,000 acres each in aid of internal improvements. Wyoming received nothing in aid of such improvements, although her needs are exceeded by no other commonwealth and equaled by few."

In conclusion the memorial says: "We

do not ask for this land because of its value, but because it is needed to provide conditions which will make agriculture in this state successful; to put an end to the controversies over range rights which have prevailed for the past few years, and which are a disgrace to a self-governing people, and to enable the state to carry out the provisions of its water laws, and thus create an irrigation system in which both the state and nation can take just pride. The grant asked for will enable the state to do this without direct aid from the national government, and will relieve the national treasury from the demands for appropriations which will otherwise become imperative."

This memorial was very favorably received by the majority of the members of the Montana Society, and a committee of three was appointed to consider the question of co-operating with the other states on this line.

A measure somewhat similar to this, as near as we can make out, is embodied in the "Shafroth Bill," which provides for the absolute and unconditional cession to the state of the whole arid public domain capable of reclamation by irrigation.

The National Advocate, Orange Judd Farmer, The San Francisco Chronicle and The Country Gentleman protest vigorously against the passage of this bill and have a great deal of convincing argument on the subject. It seems to me that the National Advocate takes a correct view of the matter when it says that the passage of this bill "would create such enormous and innumerable opportunities for all manner of gigantic schemes for land grabbing and the monopoly in private ownership of all that remains of this valuable patrimony of the whole people. * * * * And if unconditional state cession should ever prevail, the progress of the West would be retarded for a century, while her vast area of arid but fertile lands were devoted to cattle ranges when they should have been reclaimed and settled in small tracts by actual home builders."

Under the Carey Act the states each have now the right to select 1,000,000 acres as an absolute free gift if they will reclaim and settle them, and it seems no more than fair that, as the Advocate says: "when any state has reclaimed and settled these million acres, then and not until then, let it ask for more."

Upon this subject the Phoenix Irrigation Congress laid down the following principle:

Resolved, That we favor the cession of the public lands of the nation to the respective states and territories only upon conditions so strict that they will insure the settlement of such lands by actual settlers in small tracts, and absolutely prevent their monopoly in large bodies under private ownership." L. W.

STATE NEWS.

MILK RIVER, MONTANA, NOTES.

Our spring was very late and this, together with an unusually heavy snow fall during the latter part of winter, and frequent showers since, is seriously delaying spring farm operations.

High water did considerable damage to several of our irrigation enterprises, the Paradise Company having one end of their dam cut around, the Harlem Company losing their dam completely, some of the old reliable Belknap Company's ditches being cut in places, but more of an aggravating nature than otherwise, tending to merely delay. The other companies will begin the repairing of their dams immediately, with the hope that this will be done in time to give them water during the season.

Our farmers are putting in a large acreage of malting barley this season, also of oats. The hay and range grass is looking well.

The stockholders of the various irrigation canals in this vicinity are very anxious to put them in a permanent condition as early as possible. Those companies that have not already incorporated are taking

steps to do so and are otherwise preparing to complete their canals as early as possible.

W. M. WOOLDRIDGE.

Chinook, Chateau Co., Montana.

MINNESOTA.

Minnesota millers are justly pleased over the recent decision of the United States Court of Appeals, by which millers outside of that state are prohibited from using the Minnesota or Minneapolis trade mark on their goods. The decision to the contrary of this, given by Judge Showalter, of the lower court, was felt by state millers to be unjust, as they claimed that for millers of other states to put the Minnesota label on their flour was dishonest to the public, as well as the Minnesota millers. The case was carried to the higher court with gratifying result.

CALIFORNIA.

California has been suffering from the severest drouth experienced there in 21 years. The recent rains they have had will enable farmers to get a fair crop of grain, hay and fruit, where otherwise they would have had comparatively none, but no amount of rain from now on can make the crop anything but "fair"—not up to the average.

The owners of the oil wells in the Coal-inga district have decided to put the entire oil put in the hands of one man to dispose of. The large consumers of San Francisco and Oakland have been bearing the market and thus forced the rival companies to cut prices on oil. To prevent this the owners have decided to sell to one man as above stated.

California claims the honor of owning the first woman to volunteer as a nurse on the battlefields of Cuba.

Owing to drouth and frost, which has so seriously injured the sugar beet industry, only two or three out of the eight factories in the state are likely to start up.

Although the Escondido Irrigation District reservoir is not more than one-half

full of water, there is enough to save the citrus orchards in the district. This is worth more than \$100,000 to the people of the valley, even if they receive no more benefits from the water.—*Ontario Record*.

INDIANA.

It is definitely decided that the Munson Electric Motor Carriage factory will locate at La Porte, Ind. This has been talked of for some time, but it is now a certainty, as the machinery is being set up ready for work. On the 25th of April the first horseless carriage that ever appeared upon their streets delighted and astonished the La Porte people. The town is to be congratulated upon its new industry.

IOWA.

Report has it that a volunteer lieutenant named Watt, of Webster City, Iowa, was rotten-egged out of the town the other day by 35 members of Company C. In a speech Lieut. Watt is said to have remarked, "The man who goes to fight innocent Spaniards is no better than a cowardly murderer." Upon refusing to retract his words, he was treated to the eggs and rapidly made his escape in the darkness.

NEBRASKA.

The Western Nebraska Educational Association convened at Sydney April 22 and had a very large attendance. This was the sixth annual meeting. A number of papers were read by the teachers in attendance and officers for the coming year were elected.

ARIZONA.

Great excitement was occasioned recently in Phoenix by seeing one of its few Spanish sympathizers tear down an American flag and throw it on the ground. The man was immediately made to kiss the flag he had so insulted and was rather severely handled. This incident so aroused the citizens that a meeting was immediately called for the purpose of forming a "committee of safety," whose

duty it should be to see that acts of vandalism and insult toward the flag of our country be prevented if possible, and if not, that the traitors be promptly punished.

The Washington public schools celebrate the 6th day of May as "bird day."

WYOMING.

A large amount of wheat has been sowed by our ranchmen and a great deal of ground will be seeded this spring making the crops of 1898 the greatest known in the history of northern Wyoming.

A new and important industry is to be started in Sheridan county this spring. This is the mining and manufacturing of nickel steel from ore that is to be found near there. Work of putting in the plant is soon to commence.

The shipping of Wyoming sheep to England is a development of the past few years and offers a new and extensive market for western sheep raisers.

MINES AND MINING.

The recent new mining laws of the United States has made the taking up of a claim anything but the simple matter of early days, when "possession was nine points of law." We cannot give all the features of the new law but here are a few of its provisions:

"No single individual can enter or locate upon more than 160 acres, nor can an association enter upon more than 320 acres. The government, before patent issues, requires payment for mining land at the rate of \$10 per acre where the claim is situated more than fifteen miles from a railroad, and \$20 per acre where such claim is located less than fifteen miles from a railroad. The owner of a quartz mill or reduction works, not owning a mine in

connection therewith, may also receive a patent for his mill site at \$5 per acre.

"The location must be along a vein or lode; it must be distinctly marked on the ground so that its boundaries can be traced correctly. The record must contain reference to some natural object or permanent monument to identify the claim, and all lines must be parallel. Remaining details are governed by regulations established by the miners of each district, not inconsistent with national or state laws.

"The right to mine can be given only in public lands, and such lands must contain valuable mineral deposits. No claim located shall exceed 1500 feet along the vein, nor shall it exceed 150 feet on each side of the middle of the vein at the surface. It is not necessary that the locator be present on the ground. One may locate as agent for another."

The application for a claim must file in the proper land office an application for a patent under oath showing a compliance with the law, together with plat and field notes showing accurate boundaries, and a copy of this plat and a notice of application for a patent must be posted in a conspicuous place on the land in question; and this posting must be done before the filing of the application for a patent. The register of the land office has a notice that this application has been made posted in his office and published in the nearest newspaper for 60 days.

Either at the time of filing his application, or within 60 days, claimant must file with the register a certificate of the surveyor-general that \$500 has been expended upon improvements made upon the claim, either by himself or grantors, and that the plat is correct.

If no adverse claim had been filed during the 60 days, the claimant at the end of that time files his affidavit showing that the plat and notice have been posted conspicuously for the specified time, and upon paying \$5 per acre for the land embraced in the claim, becomes the owner thereof.

ODDS AND ENDS.

THE TRANS-MISSISSIPPI EXPOSITION.

The Trans-Mississippi Exposition is to have a Midway that will out-Herod Herod, judging from the reports, or, in other words, it will beat the famous original Midway of the World's Columbian Exposition. Among the amusements is one which will rival our "Shooting the Chutes," and is described by Elsie Reasoner as follows:

"A startling amusement which might be termed 'unique' is called 'Rolling the Roll,' and is supposed to succeed the well-known 'Shooting the Chutes.' A sloping railway, some immense barrels provided with seats, and a willing populace seems to be the only necessary adjuncts. Those who are sufficiently curious may enter the barrel, and strapped to the seat, are allowed to roll merrily down the hill. This unusual form of amusement is said to be exhilarating and not at all unpleasant."

The following, quoted from the same writer, has a tendency to make a wine-bibber's mouth water:

"A distinct novelty will be the Wine Cascade, a perfect reproduction in miniature of Niagara Falls. The base work, including the rocks, Goat Island and the Three Sisters, will be done in glass, over and about which will sweep an unceasing flow of California wine. The precious liquid will be conserved in the gorge below, and automatically and secretly it will be returned to the fountain head to do duty again. Another reproduction of nature will be that of Old Faithful, the big geyser in Yellowstone Park. The cost is estimated at \$50,000."

Just at present, when every spark of patriotism is aroused, I think we can un-

derstand and sympathize with the feelings of the little girl, who, upon seeing the soldiers marching by, begged to be allowed to go, crying eagerly, "Please, let me, mamma, for when I hear the cannon I'm just sure America can lick all creation, and I want to go along and be in the procession so I can feel proud of ourselves."

WHAT'S IN A NAME?

Ex Gov. Hogg, of Texas, is a man of great strength of mind, who regards with serene indifference the jokes hurled at his porcine name. When his first child, a daughter, was born, he delved into classics and christened her "Ima Hogg." This created some little comment, and several years passed by, when the news was finally announced that another daughter had come to gladden the home of the, at that time, Chief Executive of the State. And again the father had recourse to Homer, Herodotus, or Socrates, and the second daughter was christened "Eura Hogg." Friends joked, fellow statesmen smoked, and the local press ran display heads, but when, in the course of time, a little son arrived and the "Governor," as he is popularly known, promptly named him "Moore Hogg," nobody had anything further to say, and the victory remained with the ex-Governor.—Unidentified.

The Spanish newspaper cartoons, which have not even the redeeming virtue of humor, represent America as a hog.

MYSTERY AND MASTERY OF IRRIGATION.

One of the foremost things needful to make irrigation a success is good literature relative to the subject, from which the correct methods may be learned. There are a great many books being written upon

this subject, but one of the best if not *the* best, is the one by T. S. Van Dyke entitled "Mystery and Mastery of Irrigation."

Mr. Bomar, editor of the *Grandfalls New Era*, at Grand Falls, Texas, said upon receiving a copy of this work:

"I have in my library every book on the subject of irrigation that is obtainable, and that money could buy, and have read them most carefully, but none of them—no, not all of them put together—have the information in the shape for the farmer and irrigator that this one has. Every irrigator, even if he has only one acre, should have this great work."

Strong words but fully deserved, as any one who reads the book will admit.

Mr. Van Dyke is a well-known writer on other subjects, and has achieved quite a reputation for his faithful portrayal of California boom days, and for his books such as the "Still Hunter," *Rifle, Rod and Gun in California*, "Southern California," etc. So he brings to his aid in writing on irrigation subjects, not only a practical knowledge of his theme, but the ready pen of a practical writer who has that rare gift of having the right word for the right place.

Anyone who thinks of experimenting with irrigation—no matter on how small a scale—will find Mr. Van Dyke's book of inestimable value. The AGE has on hand a few copies of "Mystery and Mastery of Irrigation" in galley proof form, which will be sent to anyone upon receipt of the price, \$1.50.

Brann's *Iconoclast* is of the opinion that things are pretty evenly divided in this world after all—for the man who has a "lower-case brain" is compensated by having a "display type mouth."

Under the authority of congress, which appropriated \$20,000 for the purpose, ten officers of the survey will be sent to Alaska to make a report on the geological aspect of the country, with a view of ascertaining the most practical locations for rails, wagon roads and trails.

Some of the most important events in connection with precious stones during the year 1886, according to the United States Geological Survey Report, were the finding of sapphires, in large quantities, in Montana, also three small diamonds from the same state; the finding of small diamonds in Wisconsin, and the conclusions arrived at by scientists as to their origin; the finding of large crystallized beryls, of gem value, in Maine; and the continuation of the output of fine turquoise from the mines in New Mexico.

Miners of Nevada are prospecting for turquoise mines and there is quite a bit of excitement over the search. Turquoise mines that give evidence of being very valuable, were found north of the gold camp of cotton, that state, and this is what started the prospecting.

The Minneapolis Tribune thinks that "There are some things even worse than prospect of war and the evolution of the war poet is one of them," and gives as a reason for the "belief" that is in her the following taken from the *Kansas City Journal*:

"Must I leave my wife

In grief to smother;
Who is of my children
The devoted mother?

Must I leave her today—

To the army sent—
No money to pay
The landlord's rent?

O, war of mankind!

Put up your knife;
For I am resigned
To stay with my wife."

We have known for a long time that Kansas had a great many pests, such as cinch bugs, grasshoppers, cyclones, etc., but we did not think she had anything so bad as the above. We join with the Tribune in saying that this "is one of the things that makes us wish there was no such thing as war."

WITH OUR EXCHANGES.

A NOVEL ALLIANCE.

A score of the best-known Western writers, students and artists, have rallied around the banner of the *Land of Sunshine*, edited by Chas. F. Lummis, at Los Angeles, Cal., and will try to make in concert, "a magazine really worthy to represent the West." Mr. Lummis is nothing if not Western in spirit. He believes that, while the great magazines are indispensable, the West needs also a magazine of its very own. He has now enlisted as stockholders and staff, Pres. David Starr Jordan, of Stanford University, Wm. Keith, Margaret Collier Graham, Mary Hallock Foote, Charles Warren Stoddard, Ella Higginson, Grace Ellery Channing, John Vance Cheney, Ina Coolbrith, Charles Frederick Holder, Chas. Howard Shinn, T. S. Van Dyke, Constance Goddard Du Bois, Dr. Washington Matthews, George Parker Winship, George Hamlin Fitch, F. W. Hodge, John Comfort Filmore, and several others. The *Land of Sunshine* is nearing the end of its eighth volume. The April and May numbers announce the new syndicate.

THE FORUM.

Upon looking over the contents of the May *Forum* "The Fifty Million appropriation and its Lessons," by Hon. Hilary A. Herbert, was the first thing that caught my eye, and well repaid the perusal. In speaking of the unanimity of the vote on the appropriation bill in both House and Senate. Mr. Herbert says it "shows the extent to which our Union has been cemented by the blood of the heroes who offered up their lives in our civil war, by the generosity, forbearance and manliness exhibited by the survivors of the struggle, and by the mutual admiration which has sprung up between them, * * * and

now the chapter opened at Fort Sumter has been closed by the Fifty Million Bill in a manner that no patriot could have dared to hope for in 1861."

Col. A. K. McClure is quoted as saying that "the oneness of purpose exhibited by congress in the passage of this measure was worth all it would cost, even if the entire \$50,000,000 should be thrown into the sea."

The lesson that Mr. Herbert brings out is the one the nation is learning by having to pay the high price for ships, etc., which the urgency of the demand necessitates. There is no time for "bargain hunting;" these things must be had *at once* without reference to price. As the writer truly says, "The government that has been niggardly in making military preparations in time of peace must pay the piper and be lavish when war is imminent."

Another timely topic discussed by Dr. John G. Bourinot, C. M. G., clerk of the House of Commons, of Canada, is "Canada's Relation with the United States, and her influence in Imperial Councils."

M'CLURE'S.

The article by Hamlin Garland in the May number, "Ulysses Grant—His Last Year," gives an insight into the personality of the great general that is seldom obtained from other sketches. The hero of the battlefield, the president of the country, the two characters so often shown, are barely touched upon, but we are introduced to the man himself, whose awful suffering during his last year arouses our sympathy, while his unselfishness and uncomplaining patience under it compels our admiration. We are enabled to catch a glimpse, as it were, of his great nature.

There is a poem, "The Destroyers," by

Rudyard Kipling, which, at the risk of being guilty of rank apostasy from the faith of the present, I must confess to caring little for. The leading story, "The Polar Zone," is the first of a series of tales by John A. Hill, which, it is said, first appeared years ago in an obscure railroad journal. Mr. McClure was so struck with their merit that he intends publishing them.

Unless you are rather hard-hearted you will find tears in your eyes after reading the pathetic little story of "Uncle Luther Dowell's Wooden Leg."

SCRIBNER'S

For May gives another installment of "The Workers," just as interesting, just as pathetic and just as *true*—the real secret of the story's success—as the first chapter gave promise of. The Chicago policemen are kindly spoken of by Mr. Wyckoff, which will surprise them no doubt, being accustomed to blame instead of praise. A good short sketch is contributed by Jesse Lynch Williams, on "The New Reporter." Verses by Theodosia Pickering—"A Bargain"—are truthful as well as poetical. The bicycle pictures by A. B. Frost, will be duly appreciated by wheelmen.

THE REVIEW OF REVIEWS.

The whole foreign and domestic situation, the causes that have led to the present war with Spain, and the attitude of the other powers are topics ably discussed in the May editorial portion, and give one a clear, unbiased view of the affairs at present. "Two Great American Treaties: One with Russia—ratified; one with Denmark—deferred," by W. Martin Jones, discuss the proposed purchase of the Danish West India Islands and the purchase of Alaska, both with especial reference to Seward's policy of expansion. The war cartoons of the month—Spanish and American—are one of the many attractions of the May number.

THE LITERARY DIGEST.

The latest number received is for the week of April 30, which contains portraits of people holding places of prominence in the world at present—Gen. Russell A. Alger, secretary of war; Gen. Woodford, Ex-United States Minister to Spain, and Charles Emory Smith, postmaster general. The topics of the day are discussed as are also the recent events of literary interest. Among the latter is "The Eugene Fields that Frances Wilson Knew." Under the review of the "Religious World," is an extract from the *Church Standard* regarding the proposed change of name of the Episcopal church. It seems that many churchmen are dissatisfied with the present name, "The Protestant Episcopal Church of the United States," and propose changing it to the "National Catholic Church," or the "Catholic Church of America," or some name similar to this. This question will probably come up for discussion in the next general convention of the church to be held next October. "The Inquisition in Modern Times," is a review or series of extracts from Mr. Lilly's work on that subject, and is full of interest. It is astonishing to learn that the inquisition lingered in Italy as late as 1870.

We are in receipt of Part V. of the Eighteenth Annual Report of the United States Geological Survey for the year 1896-'97. It is well bound in two volumes, each volume containing over 640 pages, the first part being devoted to reports and statistics concerning the mineral products and coal of this country. The second part takes up the non metallic products, except coal. In this volume petroleum, natural gas, stone, precious stones, mineral waters, etc., etc., are discussed, each by a well-known authority on that particular subject. The report is very interesting and a valuable reference concerning mineral matters.

THE IRRIGATION AGE.

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--- or ---

***** *Lands* *****

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Montana, Idaho,
Washington and Oregon.

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CHAS. S. FEE, Gen. Pass. Agt., ST. PAUL, MINN.





WHEAT FIELD ON SUNSET COLONY LANDS.

THE IRRIGATION AGE.

VOL. XII.

CHICAGO, JUNE, 1898.

NO. 9.

THE PROGRESS OF WESTERN AMERICA.

What the Month has Added to History.

The "grand old man," William E. Gladstone, so long a familiar figure, not only to Englishmen, but to the world, has passed from the stage of life where for so many years he played so prominent a part. His death, which occurred on the 19th of May, was very peaceful, the quiet ending of a grand and useful life of over 88 years.

May 1st marks the grandest naval victory of history and makes Admiral Dewey the hero of the American people. The destruction of the Spanish fleet without the loss of an American ship, gun, or life, is without parallel. The nearest to it was the battle that ended the thirty years war between Athens and Sparta, which took place 2,300 years ago, or in 405 B. C. In this battle Lysander, the successful general and admiral, succeeded in capturing 170 out of the 180 vessels of the Athenian fleet. Like Dewey he did not lose a ship, but a few of his men were killed. So, after all the recent victory surpasses all previous history. It was just 310 years ago, lacking two months, from the date of Dewey's victory, that the Spanish met defeat at the hands of the English. King Philip, of Spain, was desirous of stamping out Protestantism and as England was then its chief stronghold he conceived the plan of attacking that country and with that end in view a fleet of vessels was constructed, known as the Spanish Armada. On May 29, 1588 the vast fleet of 150 vessels

and close on to 30,000 men, sailed from Spain to attack England at the entrance of the Thames river. On July 29 the fleet stood up the Channel in the form of a crescent, seven miles long, but owing to Drake and Howard, the gallant English commanders, the Spaniard's plans were never carried out, for they were forced to flee, losing 30 vessels. Fearing to again encounter the English fleet, the Armada sailed for Spain by way of the North Sea, and owing to severe storms, lost still further, so that when the fleet at length reached Spain in September and October, it consisted of only 54 badly shattered vessels and about 10,000 men.

June 1st will be remembered years hence as the opening day of the great Trans-Mississippi Exposition. On that day President McKinley pressed the button which set the machinery of the great fair in motion and the exposition was ready to receive its visitors.

That Bond Issue.

Before the AGE goes to press the bond issue for war purposes may be an assured thing; it may be passed in spite of the protests of the Congressmen who have courageously opposed it and the people who do not wish it. It seems strange that under a government "by the people and for the people" it is possible for a measure to be passed in Congress that is detrimental to the interests of the people and against which they protest. Yet such measures have been passed and what

has happened in the past may happen in the future.

Hon. Ferdinand Brueker, representative from Michigan, in his speech in the House on the subject of the "War Tariff," said: "Mr. Chairman, if there is any one thing which I have observed since I have been a member of this House more than another it is that a few gentlemen—you can count them on your finger ends and have fingers to spare—absolutely control and dictate every public measure adopted by this House." What a sad truth! And if the bond issue becomes a law it will be through the influence of the minority which seems to control.

Many eloquent speeches were made by Congressmen on the subject of the bond issue and the war tariff and one of the best of these was that of Hon. Curtis H. Castle, of California. And while we do not subscribe to all the doctrines as put forth by this gentleman, we do uphold and honor the vigorous stand that has been taken against the \$500,000,000 bond issue, and we cannot forbear quoting at some length. Said Mr. Castle: "The old Bourbon doctrine, 'After us the deluge,' is the watchword of the bond promoters." Again he says: "The people of the United States must have money and materials to prosecute the Spanish war, and we are told by the advocates of this bond bill that we must borrow of private individuals, pay interest, and transmit to coming generations the burden of our debt. * * * An interest-bearing bonded debt is the instrument depended upon by the non-producing classes in all countries of the world to absorb the profits of labor. That it is an effective one is evident in the poverty of the workers and in the riches of the non-workers."

If there were no other way in which to raise the necessary funds, except by a bond issue, these Congressmen who now oppose it would willingly see it passed, but the great objection is that the ones who are interested in its passage do not wish to find any other means to raise money; do

not wish for much discussion; no, they want to take advantage of the patriotism of the people who stand ready and willing to give their hearts' blood for their country, and rush this measure through, almost before the masses have time to realize it, and fasten upon them a bonded debt the evil of which shall be upon the "children unto the third and fourth generation."

"What strange doctrine is this," says Mr. Castle, "which says the government can draft into its armies the son, the husband and the father; it can place him in the front ranks of battle to be pierced and mangled by shot and shell, to be tramped under the feet of charging squadrons, or perchance, mortally wounded, be left unattended on the field sodden with his blood until death relieves him of his agony—yet has no power to draft into its services to preserve its life and honor the money and property within its jurisdiction? This doctrine exalts property above manhood and compels the poor man to give up his home and leave his family unprovided with the necessities of life, compels him to endure the hardships of army service, and finally compels him to give up all he has—his life—and leave his helpless wife and family to be robbed and enslaved by the wealthy bond-holders, who remain at home to enrich themselves on bond issues and government contracts."

The present war is a righteous cause to rescue the oppressed and the action of the administration is upheld by all loyal Americans, regardless of party feelings. We are not Republicans or Democrats, Populists or Prohibitionists, but *Americans* and as such ready to do anything that may be necessary for the "good of the cause." But a bond issue—and for such a sum—is neither necessary nor just and it is hoped that the measure may meet the defeat it deserves.

Censorship of the Press. Every one is anxious of course to hear the "war news;" newspapers are scanned with eagerness to be laid aside in disgust if they contain nothing new regarding the situation; and many are

impatient at the censorship of the press which the president deemed it advisable to enforce. But if these impatient ones will give the matter a little consideration they will find that the president's action is wise and just. The president's authority for this action is found in the 46th article of war, which became a law in 1806 and reads as follows:

"46. Whoever shall be convicted of holding correspondence with or giving intelligence to the enemy, either directly or indirectly, shall suffer death, or such other penalties as shall be ordered by the sentence of a court martial."

In the late war this rule had to be enforced before much headway was made by the northern forces, and in accordance with this law an order was issued by which it was forbidden to give any information, either verbally, or by correspondence, or by printing or telegraphing, in regard to the movements of the army by land or water, or any statistics concerning troops, arsenals, or military affairs, that might directly or indirectly aid the enemy, without the authority of the general in command. This was very rigidly enforced during the late war, General Sherman even going so far as to cut the telegraph wires and tear up the railway tracks behind him as he marched away from Atlanta.

No one in this land of freedom, would submit to such a tyrannical rule as press censorship in time of peace, but in time of war it is necessary and just and none should criticise the president for enforcing a law that tends to aid us in our struggle.

No Rural Delivery.

The bill to appropriate \$300,000 for rural free delivery of mail failed to pass the senate, so the country post office will not yet be abolished. It was further decided to have but four deliveries daily in the city. Mr. Teller opposed the rural free delivery plan on the ground that it meant merely the outlay of a large sum upon a scheme for which there was no demand. Mr. Pettigrew declared that the farmers themselves were not clamoring for anything of the kind. A western paper says truly: "It must be remembered that this demand for rural postal delivery did not come up from the farms of the country. * * * The demand came from those uneasy spirits who want to be 'reforming' things continually and to whom any change, however expensive, smells of reform. The farmers have never asked for the rural delivery as they felt themselves entirely competent to mount a horse occasionally and take a little recreation in going to the post office after their mail."

Welcome Visitors.

One of the pleasant incidents of the month was a call from Geo. H. Maxwell, who stopped in this city on his way East. Mr. Maxwell, besides being the editor of the *National Advocate* and the *California Advocate*, is greatly interested in the irrigation problem and has the interest of the West at heart. We enjoyed the opportunity of becoming personally acquainted with him and hope we may receive another call.

Another Western contemporary who made us a brief visit was G. S. Yauger, editor of the *Irrigation Era*, of Denver. We are always pleased to make the acquaintance of western men and hope they will call when in the city.



IRRIGATION IN IDAHO.

THE AGRICULTURAL RESOURCES OF THE STATE AND THE INDUCEMENTS IT OFFERS TO PROSPECTIVE SETTLERS.

BY JOEL SHOMAKER.

The story of irrigation and the possibilities of soil culture in Idaho seem like a fairy tale, and the truthful writer must always expect many doubtful readers, who might imagine him a land agent, picturing paper castles in the desert. This little "Gem of the Mountains" possesses some most remarkable agricultural characteristics visible to the homeseeker, tourist and investor. It contains 84,890 square miles of area, inside of which there are 600,000 acres covered by numerous crystal mountain lakes. The Snake river is fully 1,000 miles in length, within and along the borders of the State, and is navigable for probably 200 miles. This, with the Boise, Payette, Weiser, Kootenai, Clark Fork, Clearwater, St. Joseph and other rivers and streams constitute the natural water supply from the perpetual reservoirs of the mountains.

In 1890 the census enumerators returned 6,654 farms in the 18 county divisions, with 217,005 acres under cultivation. The general land office reports for June 30, 1895, show that 206,519 acres had been taken as original homestead entries; the railroad selections amounted to 52,042 acres; and the total disposed of under homestead acts, timber culture acts, located with agricultural college scrip and military bounty warrants, and selected by the state and railroads amounted to 339,328 acres. Some of the best informed residents think the area irrigated at present will reach at least 500,000 acres. The official figures give Idaho a population of 84,385 of which all but 201 are white citizens. The number of farmers increases every year by immigration from the western states and all sections of the east where irrigation is studied by those seeking new homes. It is estimated by authorities competent to approximate the area, that the state contains 16,000,000 acres of agricultural lands in the several valleys, at an altitude of less than 5,000 feet above sea level.

Many of the irrigation canals of Idaho are farmers' co-operative concerns constructed without bonding or other indebtedness, and incorporated under the general state laws. The average first cost of water rights in these canals has been in the past about \$4.75 and the expense of cleaning the land preparatory to irrigation \$10 an acre. A farm then with perpetual water right and ready for cultivation would be about \$15 an acre outlay for a good "place to make a place" in this state. There are numerous small ditches and many large canals, costing more or less than this amount, and the value of the land after reclamation is proportionate

to the expense. The eastern counties, largely settled by Mormons from Utah, partake much of the methods peculiar to those people, and canals are constructed by a union of labor without any great amount of money. Western and southern counties have larger and more strictly corporation investments but the average cost to the farmer is practically the same, location and proximity to market considered.

Southern Idaho is one of the best fruit growing sections of the northwest. Several prizes awarded at the World's Fair and other places for general exhibits, prove the superiority of apples, prunes and apricots, while other fruits of a temperate climate are equally as good. In the vicinity of Boise fruit growers report an average of 250 pounds of prunes and plums, 500 pounds of apples, 300 pounds of peaches and pears per tree after the bearing season begins, which varies from three to six years from planting, according to variety. In some instances these yields are doubled. One man who is not alone by any means, says he marketed 400 pounds of early peaches from one tree, at six cents a pound or \$24 in cash as the product from that tree, with others correspondingly valuable. Again, a man picked the fruit of an ordinary apple tree, ground the apples into cider, 18 pounds making one gallon, which was sold at 50 cents a gallon, giving \$38 as the actual product of the tree, after expenses had been deducted.

The entire Snake River valley in which are several towns, as Nampa, Weiser, Payette and Mountain Home, is included in the fruit growing district, and yield excellent crops of peanuts, sweet potatoes, onions and vegetables in addition to the regular farm crops. A general farmer at Nampa reports growing 200 to 600 bushels of potatoes, 200 to 500 bushels of onions and 17 to 33 tons of beets per acre. Watermelons grow luxuriously, one man marketing \$117 worth and giving away eight wagon loads from a half acre patch. Wheat averages 40 bushels, oats 45, barley 50 and other cereals proportionately to the acre. Some eastern Idaho farmers get over 75 bushels of oats from an acre and instances of much higher yields are recorded by truthful parties whose words cannot be doubted. Hops is one of the important and growing farm industries of the Snake valley and those engaged in the business have good returns for the investment.

Local markets consume much of the Idaho farm and garden products, and, as is always the case in western mining districts, the home market is better than where the farmer comes in competition with the general producers of the world. The northern counties have numerous valuable ore producing mines and mining towns demanding everything produced. The outside markets are reached by the Oregon Short Line railway, which has a trackage of over 1,000 miles, extending through the state north and south, east and west, connecting all the important shipping points with the Pacific Coast and inland market cities. In 1895, according to the report of the department of agriculture the Idaho production of hay was 459,598 tons, valued at \$2,872,488, and the potato crop aggre-

gated 408,240 bushels, worth \$163,296. The number of sheep reported at the same time, owned by Idaho citizens, was 899,628 shearing an average of $7\frac{1}{2}$ pounds of wool each, which at present prices would be equal to a yearly income of over one half million dollars for the state.

Different systems of irrigation are practiced, varying chiefly with the kind of crops cultivated. The majority of farmers I have interviewed use the flooding method and claim the soil will produce one-third more cereals and vegetables by perfect flooding than by any other method. As a general rule the soil is of a similar nature in all the river valleys, being sandy and easily worked. The bench or higher lands contain some alkali in spots, and are more mineralized and gravelly. The hilly slopes and greasewood valleys have a rich, black, loamy soil, which, with heat and moisture make quick growth of trees and plants. So far as I have been able to observe by two trips through the state, there is less alkali and mineralized land than in any other cultivated states of similar area in the West. This poison is drained away by furrow irrigation where the fall is sufficient, or by sub surface ditches in the flooded fields. In some places a rank growth of alfalfa or tall white clover successfully keeps down the alkali by shading the ground.

In 1893 the total mileage of ditches in Idaho, including corporation and individual canals, was estimated at a little over 13,000 miles. This has not been increased to any great extent on account of local and national financial depression, but the number of individual owners of water rights has increased annually. The northern lake counties—Idaho, Kootenai, Latah, Shoshone and Nez Perces are in the sub-humid region, being in direct line of the warm Japan current from the coast, carrying rain laden clouds that furnish abundant moisture. The annual rainfall during the growing season is never less than ten inches in these half arid counties. Although the Chinook winds keep the temperature moderate and bare the ground on the lowlands of snow, there are no hurricanes or tornadoes in any part of the state. Snow falls on the high tablelands, occupying four-fifths of the state, to an average annual depth of six feet, which means about four acre feet of water held there until needed in the growing season.

The arid counties requiring irrigation are so fortunately situated that nearly all the tillable land could be cheaply covered by ditches from natural reservoirs, obtainable in every section. In 1893 the ditches were distributed among the counties as follows: Ada, 62 ditches, 408 miles in length. Alturas, 10 ditches, 18 miles in length, covering 14,500 acres. Bear, 69 canals, 206 miles in length, irrigating 21,500 acres, under the Mormon colony system of small farms. Bingham, 86 canals, 517 miles in length, irrigating 284,750 acres by the Mormon colonial plan. Boise, 20 ditches, 60 miles in length, capable of irrigating 83,500 acres. Cache, 298 farm ditches, 299 miles in length, furnishing enough water for 82,000 acres. Custer, individual ditches, to irrigate 24,000 acres. Elmore, 50 ditches, 25 miles in length, to irrigate 10,000 acres. Lemhi, 250 ditches,

300 miles in length, to irrigate 10,000 acres. Logan, 120 ditches, 300 miles in length, to irrigate 50,000 acres. Oneida, 65 ditches, 100 miles in length to irrigate 38,800 acres. Owyhee, 66 ditches, 153 miles in length, capable of irrigating 21,300 acres. Washington, 270 farm ditches, 290 miles in length, irrigating 40,000 acres.

Irrigation pumps, windmills and other water lifting devices are not very numerous in Idaho, neither are the canals very extensive investments because of the great supply of water everywhere. The entire canal systems of the state represent an outlay of less than three million dollars, while one system in some other states has cost as much for furnishing water to a very limited area. There is no state, in my opinion, in the arid section offering such inducements to men of limited capital, for obtaining homes and an independent water supply as the state of Idaho, although the general opinion of those unacquainted with actual conditions may be to the reverse. I have no land to sell and do not even own an interest in any canal or farm in the state, but merely write what I have seen and learned from personal investigations. The homeseeker, investor and student of irrigation will do well to visit this new state before accepting all the statements of agents and writers, but at the same time remember there are other good states offering excellent inducements for colonists and the investment of capital.

RECIPE FOR A WAR POEM.

Take for your foundation "Old Glory" and
 "the Maine;"
 Equal parts of "outraged Cuba" and "de-
 caying Spain;"
 Stir in liberal quantities of the "loyal boys
 in blue"
 And the veterans of the civil war with
 "hearts so brave and true."
 Mix this well and to it add the "screaming
 shot and shell"
 And just a dash about the "fight that was
 like a raging hell."
 Then a lot of adjectives, "glorious,"
 "brave," and "grand,"
 Sprinkle them throughout the whole with
 a lavish hand.
 Then send the little pilgrim forth with
 limping, halting feet,
 To run its weary journey as a war poem,
 complete.

L. W

THE IRRIGATION DISTRICT SYSTEM.

THE INHERENT DEFECTS WHICH HAVE CAUSED
ITS FAILURE CAN ONLY BE REMEDIED
BY A STATE SYSTEM.

BY GEORGE H. MAXWELL.

"The ditches are full of bright after thoughts," is an Arabian proverb which may well be applied to the situation in California with reference to the irrigation district system. The reasons for its failure are now so manifest that it would seem as though they would naturally have been generally foreseen, but they were not. Some, who were more far-seeing than others, predicted them, but their objections were swept away by the wave of the then popular demand for some system of public construction and control of irrigation works. We have it on good authority that Governor Washington Bartlett, one of the wisest and most conservative governors California has ever had, hesitated long before signing the bill known as the Wright Act, believing it to be a dangerous measure, and that he finally did so only because he did not believe that he ought to set his individual judgment as to the measure against what seemed to be an almost universal, popular demand for its enactment. After ten years of actual experience under the law it has proved to be a disastrous and utter failure and is now as generally unpopular as it was once popular.

The New Year's edition of the San Francisco Chronicle, published in January 1897, contained an exhaustive article giving a summary of the operations and conditions in the various irrigation districts throughout the state, which was republished in the issue of the California Advocate for that month. Accompanying that article was a statistical table showing that over fifty districts had been organized, which had authorized a bonded debt of \$16,000,000. About \$8,000,000 of these bonds had been actually issued, of which only five per cent had been sold for cash, the balance having been traded for water rights and other property or used in payment for construction work. The total area encumbered by this huge debt was 2,000,000 acres, of which, as the sum total result of the operations of all the districts, only about 100,000 acres in all had been actually irrigated.

No further facts would be necessary to utterly condemn the district system. But as coming from an entirely disinterested and unprejudiced observer, and resulting from a personal visit to California, the conclusions of Capt. Hiram M. Chittenden, in his late Report on Federal Reser-

THE IRRIGATION AGE.

voir Construction, now before Congress, are of special interest. On page 54 of this Report he says:

"The [irrigation district] law is a priori, an admirable invention to secure a public administration of irrigation works, and is one from which great results would naturally be expected. But the history of the measure has thus far been distinctly the reverse. Districts were injudiciously and even fraudulently created. Works were entered upon without proper professional information and were frequently found inadequate to the uses required of them. In many cases visionary and worthless projects were put through at the instigation of contractors and promoters, who expected to profit thereby. Some districts were formed where the judgment of a majority of the property owners was against it, and in many other respects the operation of the law was almost a disgrace to the state. The irrigation bonds of course quickly responded to the influence of the system. They depreciated in value, so that disposition of them was impossible on any reasonable terms. Stagnation of work ensued, and many districts were left with a heavy bonded indebtedness a first lien upon the lands, and no irrigation works to show for it

The editorial comments of leading California journals reflects the general sentiment throughout the state. The San Francisco Chronicle has suggested the holding of a State Irrigation Convention to consider remedial measures, and in a recent editorial said: "The matter is one of great importance and should not be neglected. If the present condition of affairs is not bettered, the state will suffer injury in more ways than one. An irrigation system which does not work well is worse than no system at all, for it has the disadvantages of imposing heavy burdens without securing any decided benefits for those who bear them."

The Los Angeles Times, the leading journal of Southern California, said not long ago: "It is high time that some system of state or federal irrigation should be adopted in place of the Wright Law, which has proved a dismal failure." And again, "After five years of a period of litigation, a vast amount of bonds have been wiped out of existence, and others are taking the same course, evidently toward the same end. The whole trend of events decrees that the district organization is a thing of the past."

The Escondido Times says: "The purpose and intention of the Wright Act seemed at first to be good, but in its operation the law has proved itself the most iniquitous act that ever disgraced the statute books of any state in the Union."

And quoting from the Pasadena papers, the News says, "One of the best laws, theoretically, but worst in practical operation, ever enacted in California is the Wright Irrigation Act;" and the Star says, "The Wright Law was probably honestly intended for good, but its effect is actually the reverse. It is doing more than any other cause to retard the progress of the Perris Valley and many other valuable sections of the state."

There can be no need of further evidence to show that the district system is a failure. The next question which arises is: Why has it been a failure? The reasons are numerous. They are of two classes: First, defects in the law which could be obviated under the district system;

and second, defects in the law which cannot be eliminated under any district system, and which forces the conclusion that if we are to have public ownership and control of irrigation works we can only get it under a system of direct state construction, ownership, operation and control; and the longer any attempt is made to patch up and work along under any form of a district system, just that long will the ultimate purposes and benefits of public irrigation works be delayed.

The first immediate defect in the district system is that it delegates to local boards of supervisors and district directors the power and duty to create districts and plan and construct irrigation works on a scale so extensive that it cannot be successfully done without superior engineering skill both in planning the systems and in their construction; and it delegates to local boards of directors the duty of borrowing and disbursing vast sums of money which requires financial training and skill of the highest order.

Experience has shown that it has been, is and always will be an utter impossibility to elect, as members of these local boards, men who have the necessary knowledge or experience to cope with these engineering and financial problems. These powers and duties, if they are ever to be satisfactorily performed, must be vested in competent state officers, commissioners of irrigation and engineers.

The idea now advanced by some who cling to the district scheme, that the state can control the operations of dishonest officers, is as great a mistake as that the district officers could perform the duties in question without control. If the state must assume the responsibility it can only safely do so under a system which will vest in state officers the whole duty of planning, constructing and operating the works.

If the credit of the state must be involved, it must raise the money directly on its own bonds, and either own the works in perpetuity, and administer them as government works, or take a lien directly on the lands irrigated in exchange for a water right from the state, to be paid for on terms which may be agreed on with the land-owner before the state begins the work of construction.

Another defect of the district system which can only be obviated by a state system is that the bonded debt of a district must necessarily be a blanket encumbrance over a whole district. No man's share of the debt can be segregated, so that he can pay what he owes and be clear of debt. He must stand or fall with the whole community. If the scheme goes wrong, and the burdens on some are greater than the benefits, and they prefer to abandon their land rather than carry the load, as has so often happened in this state, those who remain are burdened so much the heavier, and no land owner can even tell in advance what encumbrance may be put upon his property, or how much he may have to pay to work out under the scheme. This uncertainty operates to discourage new settlers from locating in irrigation districts and the system thus defeats its own ostensible purpose, which is to encourage settlement.

To go more into detail would be beyond the scope of this article, but the broad underlying principles which should control in the framing of a state system are well stated in the following extract from the declaration of principles of "The Irrigation Propaganda," an association which is now extending its organization throughout California:

"We believe that the irrigation district system has inherent defects which can only be obviated by a state system under which the state would acquire, construct, own and control the irrigation system, the right to the water for irrigation to be granted by the state and in here in the lands irrigated, which should ultimately bear the cost of construction and maintenance in proportion to the benefits received, the share to be borne by each tract of land to be fixed and segregated, and no lands to be burdened without benefit or without the original consent of the owner."

The general purposes of this association are set forth as follows, in its constitution:

"Its purpose is to awaken an active interest in and to promote irrigation development and to relieve the conditions of disaster which have arisen in the irrigation districts under the operations of the irrigation district system, and to aid in inaugurating and carrying on an educational campaign to arouse the people to a realization of the far reaching benefits which would result to all classes from the construction of state and national irrigation works and federal storage reservoirs."

FARRAGUT TO DEWEY.

Said the Goddess of Fame to the pedestaled
shape

Of Farragut looming on high:

"Move over a bit on your pedestal, man,

For a twin-born of Fame draweth nigh;

Move over a bit, give him room at your side,

A trifle of space you must spare

For the first of the sons of the sea of our
day.

So make room for Dewey up there."

"And who is this Dewey?" the gray shade
replies.

"He is one of your sailors," said Fame,

"And the sea winds that blow on both
sides of the world

Are loud with the sound of his name.

Without losing a ship, or a gun, or a man,
Spain's navy he sunk in the sea."

Said Farragut then to the new son of Fame:

"Approach and come up here with me."

—Sam Walter Foss.

UNPROFITABLE IRRIGATION.

No. I.

By T. S. VAN DYKE.

Under the title of "Cessation of Irrigation," in the March number of the AGE Mr. Mount of Colorado, opens up the most important branch of the whole subject and one that so far has been very slightly discussed. There is no cessation of irrigation. On the contrary the triumph of irrigation has never been so apparent as during the recent hard times that have crippled so many who depend upon some business out of the profits of which they have to buy their living. The irrigating farmer who has attended to his land has been the most independent of any one. And even where he has lost, he has lost far less in proportion than the most solid old money bags.

But there is a cessation in the building of irrigation works as Mr. Mount says and the two reasons he gives are very correct, though they cover but a small portion of the whole ground of the difficulty. There is also a cessation in the buying of irrigable land at any price and in any location or on any terms, which Mr. Mount does not notice and is not governed by the second reason he gives, but which is very pronounced and very saddening to any one who thinks of the future welfare of his country. I shall notice this more at length in another paper and stop now only to say that much of it is due to the talk of politicians that there is "nothing in farming."

The class of settlers who have been foreclosed on mortgages and who will not buy anything that has any kind of lien on it as mentioned by Mr. Mount are not the principal ones at fault. There are many such, but there are ten times as many who have the money to buy but do not want land except to cut into town lots; men by the thousand with from three to ten thousand apiece in ready cash who three or five years ago could be induced to look at a piece of land with a view to doubling their money by selling to some one else, but who today will not leave the pavement to look at it for any purpose.

Then there is another class who will look at it if it is not over five miles from an active center but if at all remote don't want it at any price or for any purpose. Upon this is another set who will look at it five miles from a city of ten thousand people but want it at strictly backwoods prices.

Then comes the great "poor settler" class with no money and no land, the poor suffering mortal who is dying for land but cannot get any because it is all monopolized by monsters of iniquity. Now some of these are very worthy but if you want to get a real vivid idea of the proportion of the worthy ones, put in a paper of good circulation an ad. like this:

“WANTED.—Some good families who are not afraid of work to start a colony under a new canal. Land and water at twenty-five dollars (three acre feet) with annual rates at a dollar and a half an acre. Price payable in ten years with interest on deferred payments at six per cent. Entire purchase price, interest, water rates and all payable in any kind of produce raised on land at the regular market price at the nearest railroad station.”

Now anybody who knows anything of building water works knows that this price is less than the actual cost of the land and water under most of the ditches of the country and less than any one by any private system can make the combination in any part of the country in any way that is at all reliable or effective.

Considering what the combination of land and water will do, especially in the countries of long seasons and bright suns, it is the cheapest land in the world. Yet any one trying such an ad. will be amazed at the small number who even care to know where it is or anything about it. To the credit of the human race there are some, but they are painfully few. I know whereof I speak, and know too well. It is painfully apparent that poor distressed humanity does not want that kind of land. It wants:

First. Indian land.

Second. Land that some railroad, or company of large concern thought it owned but which really belongs to the government. If already improved with ditch, railroad, town, etc., these things will not injure it.

Third. Failing a good supply of these, any kind of government land will do provided the settler doesn't have to improve it too much to comply with the law, don't have to pay over a dollar and a quarter an acre, and don't have to pay that before he can sell it.

Fourth. Dry land at low figures, long time and low interest, provided always that it is likely to sell on the next boom. Otherwise it is not wanted very much even at government price, unless it is Indian land.

I am aware that this sounds very ridiculous. But there are too many who have painfully good reasons to know it is correct and that those who doubt it know little of the business of selling land of late years. Oppressed humanity wants the excitement of the city, it wants to buy its cigars through the nickel-in-the-slot machine. That is “life” while a good living in the country is social death. To be a miserable lawyer in a dingy back office, dodging your grocer today and changing butchers every week, or to be an electric doctor or magnetic healer or palmist, or something else in town competing with women for a bare subsistence is all right; but the quiet, independent life that makes a comfortable living on the farm with no frills, that has raised America's best men in all the stages of her existence, is now all wrong.

Of course this has to change and is liable to do so very soon. They are getting starved out of many cities and will have to go to the country.

But the time is not yet. The falling off came first in the land that can be worked upon the rainfall alone. The purchases of this lasted some three years after the collapse of the great real estate boom of '86-7-8 which raged in many parts of the west but reached its greatest height in Southern California. The irrigated land continued selling and in California actually exceeded in many places the highest figures of the great boom. This continued until about three years ago. The first year of the hard times affected it but slightly, the second a little more and then the demand failed rapidly until now there is little more demand for it in any part of the west at any price than there is for dry land. And this in spite of the fact that the irrigators have stood the hard times better than any other people in the country and infinitely better than the merchants and professional men of the cities. The man to be pitied through all these times is the poor devil who has to "rustle cash" to pay pay rent and buy provisions while the man on the farm does not. I mean the farmer who farms, not the man who farms by proxy or farms to get rich over night on hired labor which he is intending to pay out of the prospective wealth.

I would not have believed it possible even three years ago that the irrigated land would come to this pass although it was then plain enough with the unirrigated land. But it is a fact and Mr. Mount is only one of hundreds who happen to know it too well.

There is no reason for the friends of irrigation to be discouraged. But there is the best of reasons for looking plain facts squarely in the face. All of a sudden irrigation will come to the front with a bound that will surprise us all for there is too much in it to lie idle. The first real dry season in the east may do it or there may be a sudden exodus from the cities. It needs only a start to grow into a rush and there are plenty of fine land and water propositions to be had cheap to make the beginning with. From what I have learned of the plans of the Salvation Army I believe they have the key of the situation. Those who think them a lot of cranks know nothing of them or their purposes or methods. Religious belief has nothing to do with the settler's qualifications but he must work and work well or he will get no land and will get "fired" without pay for what he has done unless he works up to a certain standard. Nothing like that has ever been designed; for effectiveness it cannot be surpassed; and if they will adhere to that plan the Army deserves encouragement in every possible way.

Mr. Mount says that farmers under some ditches in Utah have told him that it was safer for them to trust to the little water they had or even to dry farming than to pay for irrigation at the cost per acre asked from the canal company. He says they are unwilling to pay the cost per acre to farther improve their land if they have a ditch that covers even a small portion of it. He does not mean to imply nor do the farmers necessarily mean to imply, that the charges of the company are unreasonable. But this is what the reader would infer, especially in

view of the loose talk there has been for many years about "water barons," "water monopolists," etc. With politicians and too many others this has for years been a favorite theme, it being assumed that every water company is getting rich by squeezing the poor settlers out of the last cent of profit there is in their crops. No doubt there are enough that would do so on the principle of some railroads charging all the traffic will bear; but those that have done so exist only in the heated fancy of the demagogue who thinks that everyone who puts on some cheap style is making money.

I have worked for a number of companies in a way that has given me more knowledge of the inside than most people can get. As consulting engineer, and all around "steerer" I have been in six different ones in which I took all my pay, beyond expenses, in stock or water or both, and with the express understanding that in no case was I to put up a cent. On account of the great interest I have for many years taken in the subject as a matter of business I have known the inside working of many companies besides these and probably know of more than any one else living. In three of the six companies I have been in I threw up my interest, getting out without loss and expenses paid. Out of the other three I have made some money but must frankly say I don't want any more at those figures. If any one ought to know how to be a successful "water hog" I ought and I don't hesitate to admit that I have tried to be. But if any one will show me how it is done I will do all the work, find parties to take all the risk and give one half the profits to the sage who furnishes the recipe. I don't know the man who has been smart enough to work out the problem. A very few have made money by manipulating the stock provided they had sense enough to stand from under in time, but these are very scarce and the game is a very dangerous one. Many have made good profit by buying land, uniting water with it and selling out the two with the stock of the company, turning over the whole to the land-owners who then form the company and fix the rates to suit themselves. Most all of these have been a success but no promoters have got very rich and the most of those who have made anything out of it have done so by getting water for their own land and becoming cultivators under their own ditch which they have sold out to their neighbors. I do not know of a case in which any big profit has been made, but do know of many in which even this profit is still imaginary and consists only in the present ownership of land and water which the party will probably be able some day to sell but has not yet done so because unable.

There have been cases, as at Redlands, California, where companies have charged for land and water more than the average settler can afford to pay and several times more than the cost of the combination. But this was avowedly fancy property desired by rich people for fine residences in connection with orchards and they willingly paid the price. Much of the watered property in southern California has been of this na-

ture and that is why prices have run to four and five hundred dollars and even over.

But these cases are the exception and there have for years been hundreds of thousands of acres of the finest of land with all the water that one can use at from fifty cents to a dollar and a half an acre a year going begging at from thirty five to sixty dollars. And this in a well settled country and near a railroad and in a proved locality. The only trouble with it was that it was not likely to be in demand for immediate boom purposes.

There is not one place in a hundred where one could find such land and water rights and make the combination at those figures and every acre of such land was worth for steady production four acres of the best prairie the earth ever produced. The most positive proof was all around that it had repeatedly turned out twelve tons to the acre of alfalfa hay besides pasturing cattle most of the winter. Yet one company spent nearly a hundred thousand dollars in advertising and working for colonists and averaged about one settler to each thousand dollars, principally black sheep from English families sent over here for regeneration if possible but at all events to get out of the way. They gave the state a fine "black eye", irrigating with the bottle and cultivating with poker chips. But for the credit of the Englishman it must be said he was no meaner than the American black sheep and was much more of a gentleman. This company had four hundred and fifty thousand acres with over three thousand feet of water from one of the best rivers in California, yet abandoned colonization three years ago as a dead failure.

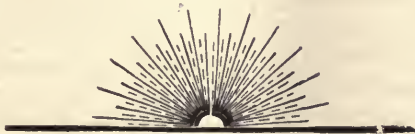
If the reader will be fool enough to put his hard earned money into land and water and build some expensive works he will find himself seized with a very sudden and violent desire to get back some of it. The inclination to hold it all out of market at a price no one can afford to pay, which he has heard of so often from the politicians, he will find entirely missing. He will find he has some very delicate crockery on hand and will do almost anything to unload it. I have known but two exceptions to this and one of them was because the company concluded it was cheaper to plant the land and work it itself than to try to sell it in small tracts to many settlers. Another was held out by the stupidity of some directors who ignored all the plans of the projectors and builders, but this did not last long. In every case that I have known the price asked by the company was far below what is gladly paid per inch by the average fool settler for a "Jim Crow" windmill of not one tenth of the efficiency of a ditch.

It is much the same with the annual rates. In most all the companies the per inch rates are satisfactory. They are highest in the land owner companies where all the stock is owned by the irrigators and where to pay a dividend would be merely transferring money from one pocket to the other. In some of these it runs to seven dollars and over an acre with every one satisfied. That is they recognize the fact that it is worth that

and cannot be had for less however much they would like it. Of the private companies I know of but one where it is three and a half an acre. This is satisfactory to the land owners and was fixed by the supervisors on their petition. The next highest is three dollars, a rate I fixed myself on consultation with many land owners thirteen years ago and to which there has never since been any objection.

The next highest is a dollar and seventy-five and a dollar and a half and I have never known any fault found with these by anyone under the canal. Then come many at a dollar and some at seventy-five cents and a few at fifty, all satisfactory. In all these cases of the lower rate there is practically no restriction on the amount of water allowed and in many cases the irrigator has so abused this kindness that he has ruined some of his land.

Few if any have measured the work of as many windmills as I have and I find that the price gladly paid for repairs by the average smarty who proposes to be "independent of monopolies" runs from three to five times as much per inch per year as it does under the highest rate I know of for far better delivery and efficiency of service from a ditch. There are some companies managed by swine, and some by those who would like to be if they only knew enough. But these are the rare exception and under most of the companies having money now tied up in land and water a man who means to work and will do a good honest job, that will be a credit to the settlement and not hoodoo it out of several years growth with bad work, can get land and water cheaper than he could put the two together in any part of the United States and can get almost his own terms as to time and conditions of payment. And in some cases he can make the whole payment in produce if he is the right kind of a man. The trouble is bad enough but cannot be charged up to water monopolies. It lies elsewhere and the sooner it is faced the sooner will we place this great subject of irrigation where it belongs. And, as I will show farther on, the difficulty cannot be removed by state or national aid, although this will be a great help. The main trouble is in those cases where the rights are all private or most of them and parties are only too willing to furnish the money provided it can be shown that there is a reasonable interest assured on the construction money. If you cannot do that you will have a hard task in getting the state or government to touch it. Irrigation works can still be made to pay and pay well but there is only one way in which it can be done.



THE DIVERSIFIED FARM.

'In diversified farming by irrigation lies the salvation of agriculture.'

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs, Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

CULTURE OF ASPARAGUS.

Asparagus is so easily grown and possesses so many valuable medicinal and money making qualities that no farmer should have even the smallest area under cultivation that does not contain a bed of roots. It appears the first thing in the spring when the family demand its medicinal virtues, and a few well cooked shoots often do more to revive a sick person than a half dozen five dollar visits of a doctor. The market demand is always greater than the supply and some of my gardener friends claim it will produce not less than 5,000 pounds per acre, which sells at from 5 cents to three times that amount per pound according to the season. One man, for whom I shipped produce a few years ago, had a small lot in the front yard, planted to asparagus and he cut and sold from this ornamental lawn over \$80 worth in one year and let much of it go to waste.

The best way to start an asparagus bed or patch is from roots which can be purchased from any seedsman at about 75 cents a hundred. They should be two years old in order that a good crop may be cut the following spring after planting in the fall. If roots are planted the soil should be stirred about a foot deep and plenty of well rotted manure be mixed in by spading or plowing under. The roots may be set in rows three feet apart and one foot in the row and will soon spread to cover

the intervening space. A good plan is to dig the hole for each root with a shovel, fill in the bottom with manure and plant the root deep, covering about three or four inches above the crown. This work should be done in the fall and the bed covered in the spring with wood ashes and spaded in before the plants show above ground. If one year old roots are thus treated a fair crop may be cut the first year after planting, but two year roots are much better.

Planting the seed is the cheapest and best way if time is no object in getting asparagus for home use or market. The seed planted in the spring require three years to come to a perfect producing state. Seed can be procured from any seed grower at about fifty cents per pound in large quantities with a slight addition to price for smaller lots. One ounce will plant about fifty feet of drill, the plants requiring thinning to about six inches apart after they get up. The seed should be soaked twenty-four hours in tepid water or have boiling water poured over them two or three times before planting. If planted in rows and irrigated and cultivated two or three times the roots will be good for transplanting to permanent beds the first fall or may be left until late as desired. Salt put on the beds and spaded in is an excellent fertilizer and the additional yield pays well for the expenditure.

THE SUGAR BEET.

The many experimental efforts at sugar beet growing during 1897 fully demonstrated that the new and profitable crop could be handled successfully in nearly every section of the irrigated West. My experience was highly satisfactory and the analysis made in Washington and at the Utah Experiment Station gave good results. The product ranged about fourteen tons per acre from raw sage brush land, and the sugar content was more than the average even on beet farms. Five analyses made during September, October and November, returned sugar in the juice from 16.2 to 20.43 per cent and 82.5 to 85 per cent purity. The samples harvested about the middle of October were the best and the transplanted tubers contained more saccharine and yielded at least two tons more per acre than those left in the original seed rows.

The land was plowed about ten inches on April 15 and seeds drilled in rows sixteen inches apart April 29. Plants were up nicely May 10, when I cultivated with a garden plow and irrigated about once in ten days to two weeks during the season. Immediately following each irrigation I used the plow and hoe keeping the soil stirred and the weeds down. Beets were thinned in June to stand from three to six inches apart. Those remaining close together had upright tops and did not contain as much sugar as those having low, flat tops, the saccharine matter being collected from the atmosphere the wide spreading, thrifty tops did best. No insect disturbed the plants and but few single tubers weighed over two pounds. The beets were relished for table use while young as greens, and later as pickles, and were eagerly devoured by the cows, horses, hogs and poultry. The tubers kept well in the cellar and I found them an all round profitable crop.

Sugar beets are small, round, oval tubers resembling parsnips. They can be grown on any soil and will yield from ten to twenty-five tons to the acre depending up-

on the location and cultivation. The price paid for beets by sugar factories runs between \$4.00 and \$5.00 a ton and the cost of growing an acre is \$30 or more varying with the value of the land occupied. Several beet growers have given me their figures on cost and receipts and, while they vary considerably the average is about \$75.00 from an acre with an expenditure of \$30 for plowing, planting, cultivating harvesting and working the crops. These figures would not apply in all localities, but where a factory is near at hand. The unsaleable beets are used for stock feeding and the tops are left on the ground for fertilizers. A good beet crop leaves the soil in excellent condition, free of weed seeds and better in every respect because of such tillages as the beets require. All farmers, however are not successful beet growers any more than all merchants are successful business men.

Beet sugar factories are being erected in many sections of the west and farmers should grow some beets in order to test their abilities and demonstrate the possibilities of the soil. There is no danger from an overproduction very soon, hence this generations of farmers need not fear but what a market can be obtained. Our country imported in 1895 over seventy-six million dollars worth of sugar and nearly one and one half million in molasses and confectionary. So long as such conditions exist there is room for home sugar factories, making sugar, syrup, confectionary and rum from beets, and insuring the farmers a market for their products. In addition to the income from growing beets the factories create a home demand for everything the farm produces and furnish labor for many hundreds of men, woman and children. The beet pulp is used for fattening cattle, sheep and hogs and a factory using 50,000 tons of beets annually would supply enough pulp to feed an immense herd of stock. The era of sugar beet growing has come and its opportunities should be grasped before the time of changeable investments shoves it to the rear.

SMUT IN WHEAT.

Smut is a disease, or blight, in wheat, and destroys many acres of the crop in Utah and the west every year. The black, stinking smut is the most general, and seems to be hereditary, in that it follows the seed from year to year, and attacks new crops. This disease is found in the perfectly formed heads and grains. The blight completely obliterates the form of the heads, and blows away, a black dust, leaving only the bare stems. Many kernels of the stinking smut remain solid, after threshing, and are not discovered until being cracked in the mill. There is no market for wheat containing smut grains, and the entire granary becomes infected if some method of destruction is not adopted.

The best method for destroying smut, in Utah, is to submit the grain to a bath of vitriol and lime water, just before time for sowing. All the wheat sown is spring grain hence the bath is given after the seed has been stored in the granary during the winter. The bath is made by dissolving ten pounds of vitriol and an equal amount of lime in a barrel of water to make enough for one ton of wheat. The barrel is filled almost full of this solution and the wheat is dipped in and allowed to thoroughly saturate and then spread out to dry. Some farmers use a tin bucket or coal oil can with holes perforated in the bottom. Others shovel the barrel full of wheat and after leaving it stand awhile throw out the grain. Another method is to put the grain in a gunny sack and submerge the sack.

By some means the grain is all wet with the vitriol and lime solution, and then spread upon the barn floor or elsewhere to dry. This necessitates several turning times by means of a long handled shovel. When the wheat is thoroughly dry it is sacked and hauled to the field for sowing or drilling. If wheat is treated with this solution every year there will be no smut and the crop will be a success. The bath seems to prevent the ravages of

ants and other insects and to fertilize the germs of the seed, assuring a more uniform state of plants. I have noticed fields of wheat, sown from the same bin, one being treated with the bath, and the other without, the one produced excellent marketable grain while the other was almost worthless.

Some farmers merely mix the dry, powdered lime and vitriol with the seed and sow it all together. This method is not so successful, and, frequently, where the grain is irrigated too soon, or improperly handled while growing, the crop is entirely destroyed. I have seen seed wheat treated by being dipped into a barrel of water, with a temperature of 150 degrees. The Indiana Experiment Station published a bulletin on the hot water method years ago and I recommended it to Utah farmers who tried it successfully. But the most satisfactory treatment is the blue vitriol and lime process. Either method is cheap and worth trying by those who are troubled with smut in their grain fields.

JOEL SHOMAKER.

TO PRESERVE THE RAISIN INDUSTRY.

T. C. White submitted a plan in a recent issue of the Fresno (Cal.) Republican which he hoped would preserve the raisin industry. This plan in brief is to form a syndicate of ten or more solvent business men, who have capital here and abroad, who will buy up all the merchantable raisins in the state at the rate of 2½ cents per pound—the present tariff on foreign raisins—one-half to be paid on delivery and the balance in sixty days. This would fix the price to the grower and prevent the many evils of the present system, chief among which is the picking of grapes before they are fairly ripe in order to take advantage of the high price of the early market, thus filling the eastern market with low grade raisins; and would also prevent the annual combine of Chinese labor upon which the grower has to depend for the greater part, as there is not enough

white labor for the work. Knowing that, owing to the uncertain state of the market that has heretofore prevailed, every grower wishes to pick early, the "heathen Chinese" practically controls the situation as regards wages, and can change from \$1.25 to \$1.75 per day. But if the grower were assured of a standard price—say 2½ cents per pound—he would know what to depend upon, would not be in such a hurry to pick his crop, and could make better terms with the eastern jobber.

"The eastern jobber could then roughly estimate raisins at 2½ cents to grower, 1 cent for stemming, packing and profit, 1 cent for freight, total 4½ cents as the lowest average price raisins could be had f. o. b., and would buy early at the best rates he could get above that figure."

This plan is one which will probably commend itself to raisin growers.

An enterprising man wishing to invest a little money would probably make a good thing by starting a creamery at Grand Falls, Texas. The Grand Falls New Era says that for some time they have been unable to obtain butter for love or money, and pathetically sighs "Oh for a creamery!"

Under the title "Hogs for Bacon," the Kansas Advocate and news says that "Attempts are now being made, and with promise of good results, to educate the razor-back of the South to feed for bacon. It must be confessed that this animal has many characteristics of a good bacon hog, and if the disposition to eat anything from an old boot to a dead mule can be bred out of her, she may yet astonish the advocates of fancy breeds."



PULSE OF THE IRRIGATION INDUSTRY.

IRRIGATION BY WELLS.

The Fresno, (Cal.) Republican states in a recent issue that "The Pleasant Valley Stock Farm company has put down eight wells at the mouth of the Posa Chine creek and developed a good flow of water for irrigation and stock purposes. The eight wells afford a flow of twelve miners inches of water, making a stream large enough to irrigate perhaps a half section of land. The water is used to irrigate the company's land which is partially planted to alfalfa.

The Posa Chine creek is dry for a greater portion of the year, not affording water for irrigation excepting during the rainy season in the winter. There has long been a theory that an underground stream of water could be struck by boring wells, but it remained for the enterprising corporation to develop the flow. Some six years ago an irrigation district was formed at Huron to develop water for irrigation by this means, but dissensions arose and as a consequence it was left to private capital to carry out the project."

ARTESIAN WELLS FOR WYOMING.

Representative Osborne, of Wyoming, has introduced a resolution asking for an appropriation of sufficient money to have several artesian wells sunk in different parts of the state which are to be used for irrigation purposes. Such a scheme is heartily endorsed by the Geological Survey and is thought to be inexpensive in comparison with the benefits to be derived by farmers. Of course, there is no hope of favorable action on such a measure at this time, for Congress is not likely to make any appropriations not absolutely necessary, but Mr. Osborne expects to secure an appropriation after the war is over for

his proposition will entail but very little expense on the part of the government.—Laramie (Wyo.) Boomerang.

IRRIGATION IN SALINAS VALLEY, CALIFORNIA.

Work is being rushed night and day upon the pumping plants in this vicinity, and a large acreage will be irrigated this season. Four centrifugal pumps are already in operation, with a combined capacity of 50,000 gallons per minute, and three more will be in operation in the near future, which will more than double the quantity of water. It is estimated that these seven pumps will irrigate at least 200 acres of land per day of twelve hours.

The Salinas Valley Water Company has three miles of its Arroyo Seco canal in operation, which will also irrigate a small acreage.—Salinas Democrat.

ELWOOD MEAD.

Elwood Mead, of Cheyenne, state engineer of Wyoming, has been appointed by the president to be consulting expert of the department of agriculture in the bureau of irrigation investigation about to be established, and for which an appropriation has been made by Congress. Prof. Mead is regarded a high authority upon irrigation matters and his addresses and papers upon the subject have attracted widespread attention. Mr. Mead is state engineer of Wyoming, and in connection with the discharge of the duties of that office he has shown himself to be an irrigation engineer of exceptional ability. He has made the problem of irrigation a special study, and there is no man in the arid region better qualified to give advice to the irrigation bureau in its investigations concerning the problems which it will be

called upon to investigate. On this account and in every other respect the selection is most excellent.—Pecos Valley Argus.

IRRIGATION FROM WELLS.

Irrigation by water from a well, if the latter yields a good supply at moderate depth from the surface, possess certain advantages over that from a gravity supply, in spite of the usually greater annual cost of procuring the water.

The wells and the source of the water are, as a rule, under the individual control of the irrigator. It is not necessary for him to combine with other men and to invest a large capital in a complicated undertaking before he can receive any benefit. It is often possible for the farmer to dig or drill the well himself, and he can purchase, sometimes on credit if necessary, the machinery, windmill, or pump for bringing the water to the surface. Being under his own supervision he can apply the water whenever, in his judgment, the plants need it, not being compelled to wait his turn or to take water at inconvenient times, whether day or night, according as it may be allotted under a large irrigating system.—F. H. Newell.

MINES AND MINING.

According to reports from one who traveled extensively in the Philippines some years ago, gold deposits are very plentiful there. If investigation proves this report correct, it will be an inducement for this country to keep the islands.

The Santa Claus mine, located near Coarse Gold, California, and owned almost entirely by Fresno, (Cal.) people, has had a force of men sinking a shaft 12 x 5 feet, and the ore taken out so far proves to be of high grade quality.

A group of mines known as the Storm Cloud group, located near Prescott, Arizona, have recently become paying property to their owner, a Chicago man. This

is another example of mines that have been abandoned as unprofitable, turning out well under proper management. For fifteen years these mines have been worked, under various owners, with but very indifferent results for the money invested, and were finally obtained by the present owner for about \$50,000. The mines are now paying their way and promise to be a profitable investment.

El Paso, Texas has been much excited by the report that the long-lost Tiofa gold mine has been found. This mine is situated somewhere in the Sierra Madre mountains, Mexico and is said to be fabulously rich in gold ore. In 1818, when the owners were forced by the Indians to leave the country, the shaft was walled in and all traces of the mine were therefore lost. Despite the fact that the Mexican government offered \$15,000 in gold for its discovery, and many men have lost their lives hunting for it, the secret was never discovered. But recently Mr. J. N. Fowler, while tracking a wounded deer, came upon a stone wall enclosing an opening and upon cutting through the wall disclosed an old mining shaft with a number of crude mining implements, and down in the shaft some rich specimens of gold. Mr. Fowler went to El Paso and reported his find which he firmly believes is the old Tiofa mine.

The official call for the convening of the International Mining congress to assemble in Salt Lake City, Wednesday, July 6, has been issued. This is a permanent organization, the outcome of the International Gold Mining convention held in Denver on the same date last year. The objects are to secure national legislation, to promote the business interests and development of the resources of the mining industry. The basis of representation is thirty-five delegates, appointed at large by the governors, and five each by the mayors and the various exchanges or commercial bodies of the country.—Ex.

At Los Angeles a small plant is being put up to handle antimony ores with a view to extracting gold. Mr. Aranville, who is at the head of the venture, claims to have a process by which quite a large percentage of gold can be extracted from antimony which does not show any gold in an assay. Between \$5,000 and \$6,000 is invested in the venture. A good location has been selected for the plant, for Kern county has more antimony mines than all the rest of the mining states put together.

STATE NEWS.

ARIZONA.

As a result of a petition from the white settlers in this region, a number of troops have been sent to the Arizona and Nebraska reservations, as it is feared from the actions of the Indians that the Sioux are planning a wholesale massacre of the whites.

ILLINOIS.

A cyclone did disastrous work in the southern part of the state on May 18, many lives being lost and a great number of persons seriously injured, not to mention the loss of property. Iowa, Wisconsin and Minnesota also suffered from the storm. One very peculiar feature of the cyclone, according to a witness of it, was the entire absence of wind except in the direct path of the storm.

CALIFORNIA.

The recently completed power transmission line of the San Joaquin electric company is said to be the longest transmission power line in the United States. It extends from the power house in the mountains to Hanford, a distance of sixty-eight miles, via Fresno.

From the Fresno Republican, we quote the following concerning the Fresno county olive oil:

"The first pure olive oil put up for sale in quart bottles in this county was shipped from Reedley to Messrs. Louie Einstein & Co., recently. The oil is rich in color and flavor and will be a revelation to those who have been using imported adulterated so-called olive oil.

This is undoubtedly the beginning of an industry in this county that will assume great importance in the near future, and is to be hoped that the attention now being given to pure food laws and the fact of its adding another to the many industries of this county will induce our people to use Fresno county pure olive oil."

TEXAS.

From the Wise County Messenger we learn that the new Baptist College, at Decatur, will be ready for students next September.



WITH OUR EXCHANGES.

THE REVIEW OF REVIEWS.

The June number, like McClure's is a "war number." The magazine opens with the editor's review of the first month's campaigning in our contest with Spain. This is followed by the detailed account of the struggle in the "Record of Current Events" and "Cartoon Comments" on the war, chiefly from foreign journals. The contributed articles include a character sketch of Admiral Dewey by Winston Churchill, two articles on the Philippines, and one on "Spain and the Caroline Islands" from a missionary point of view. The department of "Leading Articles of the Month" also deals with many questions growing out of the war. Altogether there are more than eighty pictures of subjects related to the present crisis.

Admiral George Dewey, the hero of Manila, is the subject of a character sketch by Winston Churchill. This is the only time that the life story of our modest Yankee admiral has been told in print with any completeness. His boyhood days in Vermont, his schooling at Annapolis, and later stirring experiences under Farragut in the Civil War, are all passed in review. Mr. Churchill is himself a graduate of the United States Naval Academy and the author of the very successful novel entitled "The Celebrity." He had unusual facilities for getting information relative to Admiral Dewey's interesting career and antecedents.

SCRIBNER'S MAGAZINE.

The leading article for June is "Undergraduate Life at Vassar" by Margaret Sherwood. The frontispiece is a portrait of George Washington. In "The Workers" we are given a glimpse of factory life. Besides the continued stories is a short

one, "Miss Jones and the Masterpiece," drawings by Gibson entitled "A New York Day.—Moving," and something that those whose geographical ideas are hazy will appreciate—A Group of Maps, including maps of the United States coast, the West Indies, and the Western Atlantic; the North Atlantic Ocean, and Cuba.

THE FORUM.

The June issue of *The Forum* may, with some degree of propriety, be termed a Cuban number, for the first four articles deal with the Island, or the war with Spain. Senator Foraker heads the list with a paper entitled "Our War with Spain: its Justice and Necessity." He gives a succinct account of the events which led to the present war, and, among other arguments in favor of intervention, quotes the following passage from Prof. Lawrence's "Principles of International Law:"—

"Should the cruelty be so long-continued and so revolting that the best instincts of human nature are outraged by it, and should an opportunity arise for bringing it to an end and removing its cause without adding fuel to the flame of the contest, there is nothing in the law of nations which will condemn, as a wrongdoer, the state which steps forward and undertakes the necessary intervention. Each case must be judged on its own merits. . . . I have no right to enter my neighbor's garden without his consent; but, if I saw a child of his robbed and ill treated in it by a tramp, I should throw ceremony to the winds, and rush to the rescue without waiting to ask permission."

Helen C. Candee writes under the heading "Social Conditions in our Newest Territory" a sketch of Oklahoma Territory

from the time when prospective settlers lined up ready to rush in the moment the territory was declared open for settlement, up to the present time. A comparison of the manufacture of textile fabrics in the north and the south is given by Jerome Dowd, entitled "Textile War between the North and the South." Thomas Davidson treats of the "Ideal Training of the American Girl," and does it in a manner free from prejudice and narrow conservatism, and full of good common sense ideas.

MCCLURE'S MAGAZINE

For June is emphatically a war number from the pretty red, white and blue cover on which Columbia raises her sword, to the last poem—a battle hymn. The frontispiece is an excellent likeness of General Miles in his office at the war department, and one of the many good articles is by him, entitled "Military Europe," being a narrative of personal observations and experiences. The leading article, "Cuba Under Spanish Rule," is by Major-General Fitzhugh Lee. It is profusely illustrated by Cuban scenes and by portraits of the men who have been prominent in Cuban affairs, including, among many other portraits, those of Maximo Gomez, Gen. Maso, Gen. Weyler and Major-Gen. Lee. Octave Thanet contributes a short story, "An Old Grand Army Man." Under the title of "Stories of the Fighting Leaders" are given portraits and sketches of the naval commanders who are at present before the public eye, first and foremost being that of the hero of the hour—Dewey. I cannot even mention all the good things that are included in this one number, and which one may obtain for the small sum of ten cents.

LADIES' HOME JOURNAL.

To those who have laughed and cried over "Rip Van Winkle" the article in the May number will be delightful. In it Josephine Robb gives us a glimpse of Joseph Jefferson, or "Rip Van Winkle" as he is at home, together with illustrations

of his beautiful home, his family and his genial self. "The Life of a Trained Nurse" with its page of illustrations showing the nurse engaged in her various duties, is interesting and instructive.

JOURNAL OF THE ASSOCIATION OF ENGINEERING SOCIETIES.

In the Journal of the Association of Engineering Societies, Vol. XX, March No. 3. 1898, Mr. W. C. Parmley, member of the Civil Engineers' Club of Cleveland, contributed a paper on Rainfall and Runoff in Relation to Sewerage Problems, suggesting a modification of the co-efficients employed in the Burkli-Ziegler and McMath formulas, for the discharge in terms of the intensity of rainfall, percentage of run-off, area of territory and slope of ground.

In a paper on the Erection of Metallic Bridges, Mr. Frank P. McKibben, member of the Boston Society of Civil Engineers, comments upon the rapidity with which modern pin-connected bridges are erected and discusses the methods of erecting structures of various spans, from the short span I-beam bridge up to such spans as that of the 523-foot channel span of the Ohio connecting railway bridge near Pittsburg.

The paper is illustrated with a large number of photographic and other views, including the Pittsburg span already mentioned, the Eads Bridge, at St. Louis, the Garabit Viaduct in France, the Niagara Cantilever, and the new two-hinge arched bridge over the Niagara gorge.

A paper on Brick Paving, by Mr. Irving E. Howe, of the Engineers' Club of Minneapolis, describes briefly his experience in connection with work in that city, where the prices bid were from \$1.99 to \$2.04 per square yard, and where, by advertising for the material and doing its own work, the city reduced the cost to \$1.67 ½ per square yard. To obviate the trouble often caused by contraction and expansion in such pavements, half-inch expansion joints extending across the roadway from curb to curb, and filled with California asphalt and mortar, were placed about 150 feet apart, with excellent results.

Prof. H. E. Smith, of the Engineers' Club of Minneapolis, discusses the Effects of Heating and Working on Iron and Steel.

ODDS AND ENDS.

Old King Coal
Plays a jolly new role,
A jolly new role plays he.
"Powder and ball
Are of no use at all
If you can't make steam," says he.

Old King Coal
Plays a jolly new role,
For he is king of the sea!
—The Record, Philadelphia.

Probably there is no woman who does housework who has not wished many a time for something to take "those horrid stains off her hands." A simple, and it is claimed, effectual means for removing fruit or walnut stains from the fingers is to dip them in strong tea, rubbing them well with a nail brush, and then washing them in warm water. As the time is drawing near when women will be putting up fruit, this is a good item to remember.

That Spanish fleet is as illusive and phantom-like as the celebrated "Flying Dutchman" and one is inclined to wonder if there really is such a fleet or whether it is, after all, like the vessel mentioned above, merely a phantom fleet.

"BLOW, SISTER, BLOW."

The bugler feminine is a new role for that versatile sex, but her strains will doubtless be as successful in inspiring patriotism as though blown by bearded lips. Mrs. Marguerite Raymond, 35 years old, a teacher of voice culture, a "good shot" and a native of Chicago, is the aspirant for the position of bugler. She has been assigned to Company H, Second Regiment Nebraska National Guard.

AN EXPLANATION THAT DOESN'T EXPLAIN.

The Literary Digest tells of attempts made by scientific men to account for the sensation, which nearly all of us have had of having been in a place before, or having had the same experience at some remote period of our lives, though even while it all seems so familiar we know it to be absolutely impossible that we ever were in the place before. It is this feeling that has made many give some credence to the theory of pre-existence and may—who knows—have given rise to the belief in the transmigration of souls. This same idea is beautifully embodied in the verses of Lowell called "Pre-Existence," and other poets have written snatches in this same vein.

Scientists offer an explanation which seems no more reasonable than the belief that we have lived before. They claim that the human brain is divided into two lobes or halves, which under ordinary circumstances, or rather in their normal condition, act simultaneously. Thus you go a place for the first time, and if your brain is performing its functions in a perfectly normal manner both halves of your brain act in unison, or in other words, you think the same thought with both lobes at the same instant. However, these learned men claim, if the lobes do not act normally, if there is the least shade of difference of time in their action, then you will have that odd, puzzling sensation of having seen this same place or spoken the same words before. Or if we might so express it, one half of the brain "thinks" or receives impressions before the other half, and when you receive them or think them with the other half it gives a sense of fa-

miliarity. Rather a complicated explanation that leaves one still prone to cling, secretly perhaps, to the belief in pre-existence.

L. W.

ILLINOIS DAY.

Tuesday, June 21st, has been fixed as Illinois Day at the Trans-Mississippi Exposition. The Prairie State is the first to select its "Day," as it was among the first to appropriate money for a building on the grounds, and it is promised that Omaha will be full of Illinoisans on the 21st of June. Governor John M. Tanner will attend the Exposition with his staff, and it is believed that the crowd which will pass into the grounds on that day will set a mark which will not be beaten until later in the season. The date was agreed upon at a conference between the executive committee of the Illinois commission and representatives of the Exposition, after the commissioners had visited the grounds, and formally accepted the Illinois building from the contractor.

The building is nearly as large as the Nebraska building, and is one of the most artistic of state structures. Its extreme dimensions are 63x136. It is an effective combination of the Greek and Byzantine ideas, with a suggestion of the colonial. The front elevation consists of a gable on pillars, and is a striking example of faultless Greek taste. The body of the house is in colonial severity, with a Byzantine dome in the center. The building was inspected by the commissioners, who found it to be perfectly satisfactory, and after taking formal possession placed a janitor in charge. The furnishing of the building, which will bring the total cost up to \$20,000, will be completed by June 1st when the Exposition gates are opened to the public.

An annex to the Illinois building has been erected, which will contain one of the features of the Illinois exhibit. This will consist of four large paintings of the World's Fair by John R. Key of Chicago. Mr. Key has devoted about a year to the

four pictures which are to be shown at the Trans-Mississippi Exposition. He intends to complete a series of ten canvasses, his object being to perpetuate the great exposition of 1893. One of the four already completed gives a view of the grounds and buildings looking south from the Woman's building. Another is a view from the peristyle in the Court of Honor, including the Grand Basin. The third is a scene looking north from the Electricity building, and the fourth shows the Court of Honor from the front of Machinery Hall. Mr. Key will also have on exhibition a number of World's Fair relics. The pictures, after the exposition at Omaha is closed, will be taken to Paris.

"To remove the smell of paint from a room," says New Ideas, "take a bunch of hay, place it on the floor, then sprinkle over it a small quantity of chloride of lime. Close the room for several hours, and when opened the smell of paint will be gone." This is so simple that it should be tried by anyone to whom the smell of paint is offensive.

President Madison is quoted as having said that the United States has been "useful in proving things before held impossible." Dewey's victory proves that it has not outlived its usefulness.—The (Kan.) Advocate and News.

One of the western papers makes the following plaint as to "what it don't like:" Send in your items while they are fresh. We don't like to publish a birth after the child is weaned, a marriage after the honeymoon is over, a death after the widow is married again, or a notice of an entertainment when the job work is done elsewhere.

"Your wife is a forehanded little creature."

"Forehanded? The day I stayed at home on account of the big snowstorm she made me get out the lawn-mower and oil it."—Detroit Free Press.



ENTERPRISE IN MEXICO.

THE IRRIGATION AGE.

VOL. XII.

CHICAGO, JULY, 1898.

NO. 10.

THE PROGRESS OF WESTERN AMERICA.

The Irrigation Congress. Nothing like being on time, so at this early

date we call attention to the Seventh Annual Session of the National Irrigation Congress, which is to be held at Cheyenne, Wyoming, early in the coming fall. It is desired that there be a large attendance at this convention, and all who are in any way connected with or interested in this great subject should endeavor to be present. Every section of the country can unite in the broad platform which was outlined at the Phoenix Irrigation Congress in the following resolution:

“Resolved, That this Irrigation Congress desires to impress upon the American people the profound importance of the social, political and philanthropic feature of this grand irrigation movement, whose ultimate aim is that we may become a nation of rural homes rather than a nation of large cities.”

To this we can all subscribe, whether we dwell in the West, East, North or South.

The Month Past.

June, the month of roses, has passed us with flying feet; the “sweet girl graduate” in the traditional white robe, has delivered her little maxims and quotations, plastered together with a few ideas of her own and termed an essay, and has faded from public view; the wrangle over

the Hawaiian annexation bill is over, and Hawaii is now one of Uncle Sam’s proteges; the “glorious Fourth”—doubly glorious this year by reason of the good tidings from Santiago—has become a thing of the past, the small boy of saving instincts having shot off his last cracker which he carefully “saved from the Fourth.” In the country the air is sweet with the scent of new mown hay, the birds are rife in the cherry trees loaded with fruit, and the “city cousin” remembers now distinctly that she has a “country cousin” and goes to visit her. In short mid-summer with all its beauty is with us.

The End is Near.

The war still continues but we can see in the victory at Santiago and the sinking of Cervera’s fleet the “beginning of the end.” Even some of the Spaniards are now convinced that the honor of Spain has been vindicated and that to sue for peace is the only way to preserve the sympathy of European powers. With such signal victories—unprecedented in history almost—as our country has had, it is strange Spain has not lost courage long ere this. In the land battle at Santiago, a sad but great commentary on the bravery of American officers was the heavy loss of commissioned men; the dead and wounded among them being greater

proportionately than among the privates showing how gallantly the officers led into the very midst of danger.

When the transports containing reinforcements for Dewey arrived at Manila Bay they were closely followed by a German warship, which was supposed to signify to both the United States and Spain that Germany intended to have a finger in the Philippine pie. But this was previous to the encounter at Santiago, from which Germany may learn a lesson.

The war has brought out many things of which we may be proud. The world in general may feel proud to know it has progressed so far in humane methods that the Red Cross society now has an honored place on the battlefield. This society is one of the noblest organizations and proves that the world is indeed growing more enlightened and more civilized since it is possible for this association to number in its ranks members from opposing factions, members who will care for the dead and dying irrespective of their country or belief. One of the many things of which our country may be proud is the training its men have received at the military training schools. A contributor to the *Omt. look*, whose personal observation at Tampa, Fla., gave him an opportunity of judging, says that "All that the most eager civil service reformer hopes to accomplish in the postoffice, the state department and the diplomatic service, has long been a matter of course in the army. Thorough preparation, rigid discipline, promotion for proved merit, freedom from mercenary influence—these are characteristics of the service that make one proud of the nation's defenders in these days of of excitement and danger." The friendship of England for us is another thing about which we may feel pleasure, and especially as she has given us such encouragement in

this, our time of trouble. But as for an Anglo-Saxon alliance—well that is a very pretty sentiment, but our views are aptly expressed by the cartoon, which represents Columbia declining John's invitation to take a tandem ride, saying "Much obliged John, but I don't care to ride on the back seat." And still another thing, though of minor importance, is the great demand for geographies, maps, etc., the war has occasioned. The least curious among us has a desire to know whether Santiago is in Spain or Cuba, whether Manila is a city, an island or a bay, or all three, and so this wholesome thirst for knowledge leads us to open long-neglected books and discover that the Philippine Islands are nearer China than Spain, and other information equally valuable. And then the pronunciation of foreign names! How we have stumbled over the names of the Spanish commanders! How we have wished that we might have some idea of the language. The spelling is no guide whatever, for, as an exchange has pointed out, even S-p-a-i-n will soon be pronounced "Dennis." Lord speed the day!

A Strange Experience.

The people of Chicago who have grown to regard the daily papers as being one of the necessities—not luxuries—of life, had a novel, but inconvenient experience for a few days, by being deprived of the city dailies. To see a great city—the second in the Union—depending for four days upon Rockford, Milwaukee, and even slow St. Louis, for its supply of daily papers, was something amusing. The first morning that the householder went out as usual to buy his morning paper and returned empty-handed with the information that the stereotypers had gone on a strike and the papers would not be forthcoming, he was in a very unamiable frame of mind. But with the facility for adapting

himself to circumstances which is his noteworthy characteristic, he made the best of the situation and by the next day bought a New York, a Milwaukee or some other paper with the air of always having done so. The stereotypers chose their time well, as the war news was of prime importance, but the publishers banded together and refused their demands, and the glorious Fourth passed by without the daily papers. On July 6th the Chicago dailies made their appearance, much reduced in size, being only four-page editions. "Blessings brighten as they take their flight" says the proverb, and we appreciate doubly our dailies from having been deprived of them.

**Amcu
to This.**

The *Louisiana Farmer and Rice Journal* under the heading "Irrigation Emphasized," says: "The frequent recurrence of drouths and the anomalous condition of the weather for the past few years have certainly taught the rice farmer that he must no longer trust to rainfalls to nourish and mature his harvests. In fact it might be added that to make a certainty of any kind of a crop we have to supplement some means of irrigation to supply any deficit of moisture that may occur from an absence of rainfalls. This must be done by building reservoirs and storing a good supply of water during the winter and early spring by canals debouching from bayous or by a system of deep wells operated by wind-mills, force steam pumps or compressed air. The sooner farmers provide these accessories the sooner will they meet success in farming."

The wisdom of this utterance is beginning to be realized all over the west and southwest, and the prospect of seeing irrigation in general use is in the near future.

**Division of
Publication.**

Some idea of the effort made by the Government to diffuse information on

agricultural subjects to the farmer, may be gained when we see it stated that "the total number of copies of all publications during the past fiscal year, not including the 'Year book,' was 6,541,210, and for the first half of the current fiscal year 3,290,225." The publication of agricultural matter for free distribution was begun several years previous to the creation of the Department of Agriculture, and to Mr. Henry F. Ellsworth we are indebted for the first reference bearing directly upon agricultural research carried on under governmental auspices. In 1837 Mr. Ellsworth was Commissioner of Patents, and in his annual report he devoted some space to the distribution and improvements of seeds of corn and wheat. The first really official publication of agricultural matter was in 1841, when the same gentleman made a report in which he discussed new methods of making illuminating oil from corn and sugar from cornstalks. From this small acorn sprang the great oak of agricultural publications of the present day. The monthly and yearly reports continued for several years as the only publications issued, with the exception of certain miscellaneous bulletins now and then. In 1889 the first Farmers' Bulletin was issued under the title of "The what and the why of experiment stations," 100,000 copies being issued. As a proof of the growing demand for these "in the five years, from 1893-1897 inclusive, the increase in the total number of publications of the Department has been, in round numbers, from 2,500,000 to 6,500,000 or 160 per cent." The time seems not far distant when every farmer will be supplied with the literature best suited to his crop, and the old-time "hayseed" who never progresses but does things as his father did, will give place to the educated, enlightened farmer who uses his brain as well as his hands.

IRRIGATION IN OREGON.

THE PECULIARITIES OF THE STATE--ITS DIFFERENT SECTIONS AND THEIR CHARACTERISTICS.

BY JOEL SHOMAKER.

Oregon is a peculiar state having a diversity of climate, soil and products not surpassed by any similar division of the world. The people always insist upon defining the particular section to which reference is made as Western, Eastern or Southern Oregon, each district having distinct characteristics. The state is almost surrounded by navigable waters, including the Pacific ocean on the west, the Columbia river on the north and Snake river on the east. It contains 95,274 square miles and a little over 60,000,000 acres of land. The average width from east to west is 350 miles and from north to south 275 miles. The Cascade mountains divide the state into two parts, the western being a rainy section and the eastern requiring irrigation. Southern Oregon includes all that section lying south of the Rogue River mountains and is generally classed among the sub-humid districts, not so dry as the eastern nor so wet as the western division of the state.

Western Oregon is a land of natural rivers and springs, where snow seldom falls, with an abundance of rainfall at all seasons, and fruits and vegetables reach the highest degree of perfection. It includes seventeen of the rich county divisions where farming, lumbering, dairying, fishing, stockraising and general shipping are engaged in by the remarkably healthful and energetic citizens. The warm Chinook winds temper the winter atmosphere so that green grass and flowers may be seen every month in the year and the choicest deciduous fruits grow with never failing productiveness. It is not a country of perpetual rain as is generally supposed, but a land of refreshing showers, without storms or torrents, and hence a place of natural beauty and almost continuous flowery fragrance. The soil is a black sandy loam lying upon clay sub-strata, the depth being greatest in the river bottoms, where a vegetable mold forms a portion of the rapid growing elements of fertility. Wheat is the staple product but oats, hops, flax and vegetables with all the fruits of temperate climate are among the profitable crops.

Eastern Oregon, the land of irrigation, comprises twelve counties, east of the Cascades, containing approximately 35,000,000 acres of semi-arid land, which with irrigation produces large crops of cereals and fruits. The best estimates place the area under irrigation at 250,000 acres, much of which is owned by individuals who have current wheels in the rivers and other lifting devices for bringing the water to the surface. The soil is chiefly of a volcanic formation, which is excellent for

grain and grass as well as vegetables and fruits. Some progress has been made in the lower valleys without irrigation, but the rainfall being only two or three inches during the growing season or summer months, is not enough to insure any kind of crop, even though the spring may be unusually wet. In the northern counties the Chinook winds laden with moisture, assist in overcoming aridity, but the safest road to independence on the farm is through artificial canals from the Columbia, Snake and Umatilla rivers.

The altitude of Eastern Oregon ranges from 1,500 feet to three or four times that height above sea level, and the rainfall is in proportion to elevation. On account of the ranges being utilized for sheep and cattle and the rainbelt of Southern and Western Oregon in such close proximity the irrigation projects have not been so numerous or extensive as in Idaho or Utah, but the advantages offered are so many that homeseekers will find a most inviting field awaiting the application of water to make it a perfect paradise. The mountain ranges rise high above the table lands—Mt. Hood, the most noted peak, attaining an elevation of 11,000 feet. The winters are very short, snow seldom falling until Christmas, on the mesas and in the valleys where irrigation is possible. Spring begins usually in February and general farm work can be conducted every month in the year without any inconvenience. The warm Japan current winds are felt even in the highest valleys, and their effect is to cut short the winter period to an average of about six weeks, when the cold is not severe.

The irrigated area and that where irrigation may be practiced by small and large canals, windmills, current wheels and other pumping processes includes the following counties:—Baker, Crook, Gillman, Grant, Harney, Klamath, Lake, Malheur, Morrow, Umatilla, Union and Wallowa. Various reports from the different sections give the first cost of canal construction at about \$5 an acre and the annual maintenance expense at from 15 cents to \$3 an acre. The cost of clearing and plowing land and getting ready for planting ranges in the neighborhood of \$10 an acre, varying with the location and growth of native brush. Wheat is the leading product, but all other cereals and grasses grow luxuriantly. The average yield of the several crops is about 50 bushels of wheat, 60 bushels of corn, 70 bushels oats, 6 tons of alfalfa or 8 tons of timothy per acres. These figures are approximately the general yield, with many farmers doing better and others never reaching the amounts named.

Oregon was admitted into the Union of states Feb. 14, 1859, and in 1890 had a population of 349,390 of which 1,602 represented the colored races. On June 30, 1895, according to a report from the general land office, the actual number of acres claimed under original homestead entries in the state was 219,616, while the total area disposed of for cash under homestead acts, timber culture acts, located by agricultural college scrip, military land warrants and selected by railroads, amounted to 337,990

acres. The prospective home seeker can see clearly by these official figures that there is an almost unlimited section of country remaining in its natural desert or forest condition awaiting the implements of civilization to transform it into productive farms and thriving villages. The ranges at present supply pasturage for sheep and cattle, there being less than three million wool producers feeding upon the public domains. The hay crop of 1895 was estimated at 1,166,165 tons, valued at \$7,136,930 and the potato yield for the same year was 1,124,544 bushels worth \$438,572.

Market facilities are everywhere, in all sections of Oregon. The railway lines of the Oregon Short Line pass through the state from east to west and branch out to all the more important districts, forming a network of rails 1,500 miles in length, and connecting all interior and coast markets. The Pacific steamers ply along the western coast and about 400 miles of the Columbia, Snake and Willamette rivers are navigated by elegant passenger and freight steamers. Canneries are in operation at Portland and the best market prices are obtained for peaches, pears, plums, prunes, apples and berries, for which the state is a noted land for growing. One fruit grower reports an average crop of strawberries being a little short of 14,000 pounds per acre, selling for about \$700, while an acre of blackberries or raspberries brings a similar sum. The canning of potatoes, peas, beans, and corn opens a good market, at home for all such vegetables that can be grown.

An area equal to 16,000,000 acres of the coast and mountain lands of the "New Empire" as Oregonians delight in calling their state, is covered with forest timber, which is too vast to admit of description. Here the lumber cutter finds a paradise in fir, spruce, hemlock, cedar, pine, oak, maple and other varieties, some reaching a height of over 200 feet, as straight as a shingle. The yield per acre ranges from 50,000 to one quarter million feet of the finest lumber produced in the world. When the timber has been cleared from a section the land can be irrigated and cultivated without diminishing in fertility for a quarter of a century. There is always a market for every thing made of timber, from a pick handle to a ship mast and the facilities for getting this to the seaboard or inland cities are unsurpassed. This great industry creates a demand for the products of the farm, ranch and dairy and thereby assists in building up every home in the state.

The irrigated lands of Eastern Oregon produce excellent sugar beets and a market for 10,000 acres of these tubers will soon be in existence at Baker City, where a factory is being erected. This will create a demand for small, well tilled farms and enhance the value of all products. But sugar beets yield no better in this section than do all other root crops, therefore the irrigation farmer with an independent water supply has everything in favor of diversified agriculture. Beans, melons and squashes are very productive, and the demand for such crops is greater than the supply. Wheat, oats, hops and hay grow profusely and can be

sold any day in the year. Fruits of every variety are always in demand and crops seldom fail if the vinyards and orchards are cultivated, pruned and properly irrigated.

Mining is an important and growing industry in the mountain counties of Oregon. Nearly all the useful minerals and precious metals are found in the state and those engaged in extracting the rich treasures from thir hidden vaults are patrons of the farmer. Added to the fishing, manufacturing and other industries enumerated this "New Empire" offers superior and tempting inducements to colonists who desire small land holdings, where intensive soil culture is practiced. Land sells at from \$5 to \$50 an acre, according to location and many farms can be rented at reasonable rates. I do not give all these facts to cause a boom in real estate or to induce homeseekers to leave other irrigated countries, but merely state the truth for the information of hundreds of anxious inquirers. I have no land to sell and am not an agent for any immigration bureau or corporation of any description.

Irrigation in Oregon is in its infancy and an extensive domain, remains untouched by the magic power of artificial moisture. The chances for individual water ownership are many if the claimant can construct wheels, windmills or pumps, or has the money to purchase them. Colonial ditches could be built on the co-operative plan in some sections and artesian wells may be cheaply obtained. In many places the farmers have small ditches taken from creeks and rivers with but little expense, except the plowing of the waterway. Numerous springs might be developed and made to do duty in irrigating many acres, while the sheet water from upper mesas could be tapped by wells and pumped to the surface. These are excellent locations for investors in large irrigation enterprises, and altogether the fnture of irrigation is a brilliant star which shall yet shine in rich effulgence throughout the great northwest.

UNPROFITABLE IRRIGATION WORKS.

No. II.

BY T. S. VAN DYKE.

The rock on which most irrigation enterprises have split is building works and trying to sell water afterwards. This has been a failure in most all times and places and cannot well be otherwise. Nothing would seem more easy than to sell water to a tract of land on which a lot of miserable settlers are hanging by the eyelids, waiting for Providence to send that long expected tenderfoot to buy them out before the storekeeper who has a mortgage on the land for provisions can foreclose the mortgage. Yet nothing is harder.

Few things appear more simple than to sell water in some way to that miserable storekeeper who is on the verge of bankruptcy because he has "staked" too many of the dry ranchers and has had to take the ranches. He will groan as deeply over his load as any one, will swear that the land is worth less than nothing without water, but when you come to sell him some he suddenly does not need it.

Few things seem more simple than to induce the banker who gets that land from the bankrupt storekeeper to do something that will make it an asset in somebody's hand and stop the row of the financial bricks it starts tumbling. But no, he will go bankrupt on a stack of it and his receiver will swear over it still more, and the man who buys from the receiver will never forgive himself for his folly, but the last thing any of them will do will be to buy water. They all admit the necessity of water and admit generally that it is cheap enough. What then is the matter? Haven't the money? All right, we will fix that in a minute. You concede that without water the land is practically unsaleable and that with it it would be readily saleable at two or three times the price at which it now goes begging. Just give us half of it for water on the other half and you need not put up any money. A very simple looking proposition but you are no nearer selling water than before.

And what then is the matter? Only this and nothing more. Each one in the chain knows the value of water as well as you do. He knows that half the land with water is worth several times as much as the whole of it without. And for this very reason he proposes to absorb the entire difference between the value of the land wet and the land dry. He thinks you should be paid of course for the capital you have invested in the work. But that is the business of the tenderfoot who buys from him. After buying he should reward capital by paying an annual rental sufficient to maintain the work and pay an interest on the cost. In the

meantime the land owner will pocket all the difference in value created by your capital without risking a cent himself or incurring any obligation.

Here is an entirely new principle of human nature developed by irrigation. It is not the only one. But the consequence of this one is that the building of irrigation works becomes exactly the reverse of building water works for city supply. If you have a city of so many people to build for you can calculate with certainty that ninety-five, ninety-eight or even ninety-nine per cent will take and pay for water and take it continuously from the very day it is first delivered. Where such is the case it is very easy to make the rentals pay a fair interest on the cost of the plant, because every one begins paying at once and continues paying.

But with irrigation works you can figure quite as certainly the other way. If there are fifty thousand acres instead of people you can calculate that not a thousand will take water the first year. The second year it is not likely that there will be three thousand acres paying and irrigation supports so many more people to the same area than rainfall that five thousand acres in five years will be quite a rapid rate of settlement unless there is some special boom under way on which no calculations can be placed.

For the city you can build small works at first and extend afterward. But for the land you must build works large enough to satisfy people that there is to be a large and permanent settlement or you will get very few settlers to start with. As a rule the settlers or those who own the land when you build the works, may be counted out as a source of revenue. Here and there the owner of a quarter section may take water for a ten or twenty acres but the rest he will hold out to sell to a tender-foot. This would be all right if one would sell at a price that would permit the new comer to buy water. But not a bit of it. He wants the highest price there is and will hold it out of market for years hoping to get it. If the stranger does buy it then he is horrified to find that you want something for the water beside a pitiful annual payment that is rarely higher than necessary to maintain the works in effective shape. When one has bought dry land at a hundred dollars an acre because there is a ditch above it but one thing remains. He must get water for nothing in order to make it worth what he paid for it.

In the meantime interest is running on the investment, the office expenses and the maintenance of the ditch in good order cost almost as much as if the whole fifty thousand acres were settled and paying. All of which means that bankruptcy is in sight. The promotor who has sense enough to crawl out from under in the early stages of the game may make something, but the capitalist who smiles when he buys him out will soon be holding the empty sack. I know all this sounds very foolish to one who has never been through it, but go and build some

fine water works where they are very much needed and all that, go and mount some first class proposition with all the conditions of success and one that some day will be a source of great public wealth, ride it two or three years and then criticise me.

To many all this was well known over twenty years ago. Irrigation works in India, and other parts of the world as well as in the United States had failed thirty years ago and over from that cause. But it was quite as quickly discovered that while water *in its own name* would not bring the cost of getting it on the land; it would bring from three to ten times that amount if done up in a very thin covering of dry land. To ask half of a piece of land for making the other half worth three or four times what it was worth before is monstrous robbery. On the instant the proposer becomes a thief and a monopolist. But if he has a few thousand acres of dry land for which no one would give five dollars an acre, brings water to it and offers it for a hundred dollars an acre, on the instant he is a gentleman and a scholar, a grand public benefactor, a man who makes the desert blossom as the rose, makes two blades of grass grow where there was but one before, etc., etc. The old skinflint who never did believe that land was worth anything pulls his wallet and pays the highest price for a piece, while those who, in the early stages did their best to kill the proposition by telling everyone the land was worthless, are now really astonished to see how productive it is and advise all their friends to buy some.

Those who undertook the first development of water in Southern California were all aware of this peculiarity of human nature. The grants, or large Mexican homesteads of many square leagues instead of half a mile square, have been very much abused by those who know little of these matters. But they have been the foundation of nearly all the prosperity of this country. The builders of nearly all the water works had absolute control in one hand of the land and water by buying the grant that controlled them. They thus had the cutting of a clean piece of cloth. A few old patches here and there would have spoiled Riverside, Pomona, Anaheim, Santa Ana, Pasadena and similar places that are now so perfect. Every small land owner would have thought he held the key of the situation and would have done nothing to advance the building of the works by ensuring a revenue. The land and water were bought together, laid out in the best manner, sold together, so much of the stock being transferred with each acre or tract of land to represent the water right. When all was sold the original projectors had parted with the stock unless they kept some with their own land. The company thus became a land owner's company, fixing the annual rates to suit themselves. As paying dividends would be taking money from one pocket to put in the other these rates were fixed at or about the cost of actual maintainance. These are not only the most successful of all the water companies of California but practically the only success-

ful ones. I can count at least twenty in which trouble of any kind is an unknown factor; and in the very few where there has ever been any friction it has come from extravagance or political quarreling, having nothing to do with the system. All these are safely out of the woods whereas I do not know a company operated on any other plan that can be said to see clear daylight ahead with certainty.

Nothing is more impossible than the formation of one of these companies after the land once gets into many hands. If there is no rainfall settlers cannot live and if there is rainfall enough to enable them to exist the cry of "no irrigation required" will be raised the moment you propose to sell them water, and in any event you will have so many trying to gamble on your work without risking a cent themselves.

This was one of the causes that led to the passage of the Irrigation District law, now generally recognized as a failure. It should not have been a failure, but neither should human nature. The author of each meant well enough. It was supposed that those who hang back expecting others to make them rich without their lifting a finger could be compelled by a tax to contribute to the cost of water. There is no way to do it and when you strike such a community take the next train. No one yet ever made a cent by building water works for such people and no one ever will make anything.

It is plain that in the above case of the land owner's company the works were built out of the enhanced value of the land. The difference in the value of the land wet and dry bridged the period of waiting for settlement and paid interest on the capital that otherwise could not have been met. The land was bought at from ten to thirty dollars an acre and sold at from fifty to a hundred and over. The difference really came out of the tenderfoot who was happy in his bargain. It went where it should go, into the works, and no one was robbed. It is this difference that the land owner will try to pocket for himself if the land is in many hands and years of time will not prove to him that it is one of the most foolish of all forms of trying to get something for nothing.

With this fund to cover the time of waiting for settlement a company starting with any reasonable amount of capital can succeed even though settlers do not come very fast. But there is a limit to this waiting. In Southern California settlement has in about all cases been rapid enough to carry the project through. But there are other states and territories where this has not been the case. Attempts to colonize with a number of families in one organization are frequent and much large talk is indulged in by many of the number of families they can place on the land. But the delivery of the goods is often a very different matter. And if there are many real estate agents about at the time of their arrival the colonists are liable to be scattered to the four winds before the day of their arrival is spent. I know one colony of about two hundred imported from England some years ago, and herded with great care en

route, that scattered like a coop of wild chickens let suddenly loose when they reached the station ten miles from the land. Not one of them ever saw it. The agents of a dozen other propositions were on hand and scared them all off. But until the last few years it has not been difficult with good conditions of land and water in one hand to find settlers fast enough if the owners of the land had any sense about handling it—a very important point we will consider farther on.

Every attempt to ignore this principle of making the enhanced value of the land cover the time of waiting for settlement; and every attempt to build works as they are built for city supply and depend upon an annual payment for the use of the water to pay any interest on the investment, besides maintaining the works, is quite certain to result in disastrous financial failure. Most of the failures of irrigation works are from this cause, and in almost every case it could have been learned in advance had the builders taken the slightest pains to learn anything about the business from others who had been through it. Where the land is in private hands water cannot be sold fast enough to save the projectors of the works unless they are marvelously simple and the land owners wonderfully appreciative. The few who will help are not enough, for the crops the great majority want the water to raise are not oranges or alfalfa but tenderfeet.

Where the land is so barren without water that it is impossible for any one to live upon it, and especially where it is impossible to comply with the homestead law, profitable irrigation works may still be built even with all the land in the hands of the government. Here the arid land law has been a great public benefit. The settler under it is compelled to secure water for the land in order to make his filing and proof. He cannot sit in the way as a speculator and refuse to contribute anything toward the work that is to make his land valuable. Many who know little of its workings have raised the regulation howl about monopoly and demanded the repeal of this law. But without it there would be nothing but desert today where the marvelous fields of Salt River Valley now smile around Phoenix, and many another thrifty settlement owes its existence entirely to the fact that the settler had to buy water of a company or else let the land alone.

Few, if any, have had my experience in making contracts with land owners for water and in trying to induce them to buy, either as individuals or as communities. I have graduated at the business and would advise all those who wish to retain kindly feelings for their fellow man to keep piously out of it. You can get bushels of promises and smiles, good wishes and handshakes without number. But when you pull out the paper that is to be signed to make all this brotherly love and recognition of true merit available as an asset to ensure interest on the money that is to go into the work, then——excuse me, my thoughts are too deep for utterance. And to know how much you can really love your

fellow man you should strike the magnanimous chap who appreciates all these difficulties, knows that capital must have some interest, that waiting for settlement is too slow and that the land must do its share etc., etc., and then after scratching his head for a week or two and wanting a dozen consultations with his wife decides to buy water for ten acres out of one hundred and sixty.

I think it was Mr. Kinney of Utah who said at the Irrigation Congress at Albuquerque that, as between water hogs and land hogs his sympathies were with the water hog every time. He represented neither but he had seen enough to know what was the matter. While other parties are to blame also for the failure of many irrigation works the land owner should not be overlooked. The sooner the blame is placed where it belongs, the sooner we will get more capital enlisted in these works, and enlisted in a way that will not bring discredit on the only thing that will now increase the productive power of our country to any great extent, and the only thing that is sure to make cultivation of the soil once more popular and respectable by making it profitable and easy. Within my experience, which has not been limited to California either, the land owner is more to blame than any one in the combination. He must recognize the fact that one can get land by perjury, by waiting for dead men's shoes, by marrying rich widows and various other ways, but to get water by a reliable aqueduct from a reliable source takes a long stern chase with cold cash and bushels of it. In many cases, one half the land for water on the other half, besides the maintenance fee that must be paid to keep the works in good order, is not enough to ensure against bankruptcy. I know cases of good land and plenty of water, presenting no engineering difficulties, and under a climate where the growing season is double that in most of the states, and the land, the most fertile that the sun shines on, where three quarters of the land given outright by the government would hardly save the proposition. On the other hand there are many cases where all the land is now in private hands, but most all of it lying idle for want of water, where one half for water on the other half would ensure a system that would more than quadruple the immediate selling value and pay a good and sure profit on the money invested.

Nothing is now more idiotic than for the land owner to think he can escape this rigorous law of compensation. He could for a time, though those who have made anything out of it are very few compared with the number who have been frozen out during the chilly period of waiting. But capital the world over is now as fully aware of this law as it is at last of the fact that a prospect hole is not a mine. No more works will be failures from any such cause. So much water must be sold in advance, under a contract giving a lien on the land for the payment before the works are built, or so much land must be deeded for water on the rest. The latter is often the better plan and by placing the deeds in escrow it may be made perfectly safe. To try to avoid both of these ways is one

of the most foolish of all the forms of trying to get something for nothing. It has beggared thousands in the waiting, but now the day is done when any amount of waiting will avail. The sooner the land owner awakes and says: "I know what water costs and expect to pay for it, I want the works to be a financial success because I don't want my land under works that are a failure" the sooner he will get somewhere before he dies. And on that basis there is plenty of capital today that will take hold of irrigation works and plenty of places where they can still be made to pay.



MEXICO.

Mexico is associated with romance and mystery. The early races who settled it sometime in the 7th century are as mythical as the "little people in green." Faint traces of their deeds and past glories still remain to make Mexico a land of interest to the antiquarian. The first race of which so little is known was followed in time by the Aztecs, who were still a powerful people when Spain first set foot in the land, in 1519. Montezuma was the Aztec ruler who then occupied the throne, and the people were a quiet, industrious race, active and enterprising but not at all a war-like nation. In regard to enterprise and industry the present Mexican has sadly degenerated, as he is notoriously lazy. As a proof of this latter statement, if any be needed, we quote from a late issue of *Modern Mexico*.

"The mango season has begun at Tampico; to the sorrow of the superintendents and gang bosses. They would like to see mangoes abolished. The natives love them. The reason the men who are responsible for getting work done dislike the mango is that the fruit is so cheap. During the summer the peon can buy 100 luscious mangoes, each as big as his fist, for 12 cents. A hundred mangoes are all the food a Mexican will ask for several days. So he lays in his supply. He does not have to buy fuel; he needs very few clothes; so why need he work while the mangoes last? He doesn't."

That Mexico is improving is true, and that the improvement is due largely to the advent of American capitalists is also true, but it is still far from being the Eldorado many think it. As an investment for men of means it offers many inducements; to the poor man, none at all. The same publication quoted above frankly says so under the heading, "The Truth is Good Enough," believing that in telling the truth regarding Mexico it will be more a factor for good to the republic than are those who persuade settlers to come under false promises and inducements. The article says:

"Mexican labor is not always cheap. There are sections of the Republic that have been known to have drouths. There are some dishonest people who describe Mexico as a land of milk and honey for their own selfish ends. Every man who is brought to Mexico under a misapprehension as to its resources and the possibilities for profitable investment eventually harms the Republic more than he is harmed. The opportunities for agricultural and industrial investment and trade expansion in Mexico are many and varied in character. But the truth should be frankly told about these advantages. There are many advantages. There are many chances for the investment of large capital where there is one for the man of small means. There is no room at all for the poor man. There are plenty of poor people already in Mexico. The Amer-

can laborer cannot compete in wages or the standard of living that satisfy the native peons."

There is little skilled labor in Mexico, the work being done by the most primitive methods. As an example of this it is only necessary to state that hundreds of railways have been built there without using a horse or wagon, let alone a steam shovel. Capitalists have found in many cases where the work is temporary in nature, such as road building, etc., that it is cheaper to hire a large number of men and allow them to work after the manner of a hundred years ago than it would be to instruct a smaller number in the use of machinery. So the contractors have found a cheap and effectual way of keeping the track-layers supplied with timber is to pay the native laborers or peons, one cent each for carrying the ties forward from where they were dropped by the construction train. The worker has a card suspended from his neck, and whenever he carries a tie a hole is punched in his card, on the principle of score cards at a progressive euchre party. At the end of the day he is paid a cent for each hole in his card, and will often make sixty or seventy cents a day, though the ties have to be carried in many instances a quarter of a mile. The section hands work from 6 o'clock in the morning until dark and receive, as their day's wages, fifty cents.

The Mexican is slower in learning to operate a machine of any kind than is the American laborer, but where he succeeds in mastering the mystery of it he makes a very good operator. However, when he has progressed this far he is content to halt; he has no desire to learn more; no curiosity as to how the man next to him does, and never attempts to make any improvement or innovation in the manner of doing work. In other words he is not inventive in the slightest degree. One queer phase of Mexican character is shown in the large machine shops, where it is found they will work well and contentedly under American, German or English foremen, but draw the line at working under the supervision of one of their own nationality.

The cotton industry in Mexico has begun to be one of its recognized sources of income. Most of the cotton mills are managed by resident Spaniards, who seem to be able to run them cheaper than either Americans or Englishmen, making a profit of from 20 to 40 per cent. a year on their investments. Coffee-raising is another paying industry, or to be more accurate—it is *the* paying industry, always having stood at the head of the agricultural exports. It is said coffee raisers make a profit of from 100 to 200 per cent. on their coffee, and that their recent "kick" about low prices was because they could no longer make 300 per cent., as was formerly the case. It can be raised at an expense of but 8 cents silver per pound, transportation to New York is about 50 cents per hundred pounds, where it is sold for from eight to sixteen cents gold, per pound. The United States is the market for the greater part raised, the remainder of that exported going about equally to England, Germany

and France, while Spain, Holland, Italy, Belgium and Guatemala take very small quantities.

While Mexico is no place for a poor man to go, it offers many inducements for the investment of capital, and among them is the raising of live stock and cereals. An American farmer with but small means might profitably invest in Mexican land to raise céréals and fruits, instead of devoting attention to tropical fruit raising, as there are practically no cultivated peaches, apples, pears, or small fruit, except strawberries, on the market, except the small quantity which is imported from the United States. As there are many localities in Mexico where the soil and climate is favorable for the growth of these fruits, and as there is a good demand for them, the subject will bear investigation by farmers looking for locations.



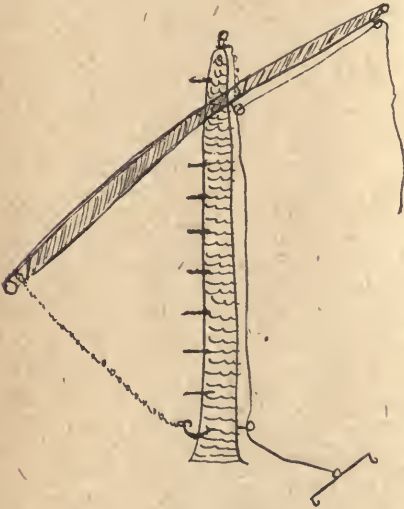
THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs. Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

THE UTAH HAY STACKER.

The people of Utah have many home-made devices for farming, but there is none more simple of construction and valuable than the pole stacker, found on many farms and in and around the corrals and stack-yards. This useful assistant during the hot months of July and August saves the employment of two or three men, if the



farmer has much hay, and does away with the man-killing pitching from the wagon to the stack. There is no patent on the stacker and any man with ordinary intelligence can construct one in a very short time, that will stand for years, ready for use whenever the hay harvest time comes. Two poles, two chains, three pulleys and a rope are the necessary parts, but one pole is all that need remain intact after haying, the others may be taken down and used elsewhere.

Most of the stackers are made of straight well seasoned balsam poles and built stationary, only the long chain and rope being removed after stacking is completed. One pole, of good dimensions, is sunk in the ground about three or four feet, and stands as a post twenty to thirty feet in height, according to the size of stack desired. Before setting the post, holes are bored in one side and oak or maple pins inserted, or slats are nailed on about two feet apart to make a ladder, and the top is cut in a groove to hold a small chain. After setting if the post is not solid it may be braced by nailing a board to the barn or another post, or poles can be set so as to lean against the stacker and prevent any wriggling about under heavy pressure.

A smaller pole is fastened near the top of the post by a short chain, and left loose to drop probably two feet. The butt end is then chained to the post in such a manner as to swing round as the hay is carried. A pulley at the smaller end, and one in the middle of the light pole conducts the fork rope to another pulley at the bottom of the post, where a horse is hitched. Any hay fork may be used and large or small quantities can be unloaded quickly, the time depending upon the kind of fork. When the fork is inserted into the hay, the pole swings gently into place, dropping the hay just where the stack is wanted. Any one not familiar with the merits of this stacker will be most agreeably surprised at its excellent working and consequent saving of time, money and labor.

JOEL SHOMAKER.

CORN BY IRRIGATION.

Corn is a semi-drouth crop in the lands of irrigation, but the application of abundant water at all seasons, from planting to harvesting, will not increase the yield. The best corn growers I have met throughout the west claim that two periods of irrigation are all the crop will stand without materially reducing the quality and quantity, and my experience has proven the assertion correct. The flint varieties may be planted in most sections of the irrigated domain any time from April to August, and if properly cultivated, will yield abundantly. I have seen two good crops of King Philip grown in the same land, both maturing and yielding well each crop, having but one irrigation. The man who did this extraordinary work informed me that he had harvested ninety bushels from one acre, near Salt Lake City, the only irrigation being while the stalks were in tassel and forming the ears.

The land intended for corn should be well plowed, thoroughly harrowed and leveled and the furrows marked out and water run through several days before planting. This gives sufficient moisture for germinating the seed and starting the plants to growing quickly. The short varieties may be planted three feet apart either way, or closer, with two to four stalks in a hill. A shovel is an excellent tool for planting if a regular corn planter is not obtainable, and from four to six inches the depth covered, if the soil is of a suitable character. When the plants show along the row, cultivation should begin, and the best implement for this is a small toothed cultivator, arranged to cut shallow and close to the corn without disturbing the roots or covering the stalks. The field must be kept free of weeds and the soil stirred three or four times, without hilling until the tassels begin to show.

During the hot noondays the corn blades will twist up and look like the drouth has overcome the stalks, but do not be in a hurry to put on the water. If the blades open at night and the ends are still green the

corn will be all right. When the tassels begin to show and the silks are in sight let the corn have plenty of water, but do not allow the water to soak up or run around the stalks, above the surface. The very earliest and latest varieties will always give the best satisfaction because the tasseling period comes just before or after the hot drouthy days of August, when if irrigated the sun will generally parch the blossoms and thereby prevent proper pollination. I have planted rows side by side, early, late and medium, and watched the results with much interest. There is no doubt but that the hot days will cut short a crop just tasseling, especially if it is irrigated.

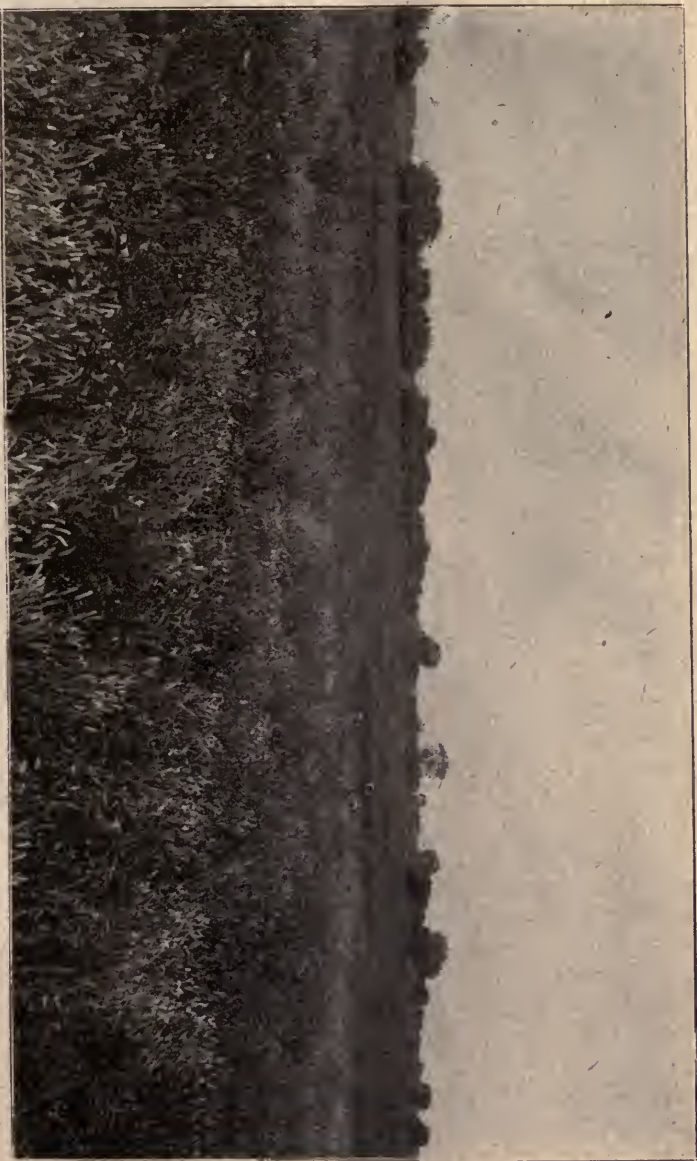
Some successful corn raisers irrigate twice after the tassels show, stopping when the corn is fully formed in the ear. The water is turned in furrows near each row and left to run until thoroughly soaked through the ridge containing the stalks. In some land an hour or two is enough time for this soakage, while in the gravel and lava formation of many mountain slopes, the water may be changed once in twelve hours and the roots not get too much moisture. If irrigated too early the corn turns yellow and many outside hills fail to make any kind of ears, while the middle of the field will contain long, slender stalks with plenty of fodder, but half filled cobs. The corn roots of an over irrigated field ball up so that a hard wind will blow over the stalks, but where irrigation is delayed until the proper time, the strong brace roots, formed above ground and noticeable in a dry season of the rain-belt countries will be formed and the corn will yield profusely.

INCREASING THE SQUASH YIELD.

The squash is a most valuable farm and garden product, which can be used in several ways as food for man and beast, and sold at good figures from the time of ripening until the following spring. An acre planted four feet apart either way and cared for properly will yield more feed for cows and hogs than a similar area planted



BARLEY FIELD ON BERKSHIRE FARM, KERN CO., CAL.



WHEAT FIELD, ALAMEDA FARM, BAKERSFIELD, CAL.

to corn. In addition to the crop harvested there is a change of diet assured, which is so much needed during the long winter months, and the animals will always show their appreciation by taking on fat. But the squash requires good soil and careful cultivation to make satisfactory returns on the investment and insure the ripening of fruits before frost. If more care was given soil preparation and vine cultivation the value of the squash crop would be much enhanced.

My method of planting is to prepare the ground, furrow out the rows about four feet apart, run water through them and plant in hills, after putting in a shovelful of rotted manure. The plants are tender and very susceptible to cold and wet, and hence the seed must be planted late in the spring in soil that will never become too wet. A slight skimming of the top of the ground with a hoe, to kill out weeds, is all that is necessary until the vines begin to form, when plowing near the hills is valuable. If irrigated before the blossoms appear, the water should merely be run through and turned off, as early irrigation certainly curtails the product. The vines will run thirty feet or more and throw up an immense foliage, which will destroy the crop if not prevented. The only method of stopping this growth is to top the main vines and prune back the branches.

The topping and pruning should be done with a sharp knife or long shears. An old pair of sheep shears is a splendid topping and pruning tool. When the vines have extended three feet or a little more either way and fruit has begun to set, the topping ought to begin and be kept up vigorously, as new shoots form during the season. I have harvested from six to ten good squash of the Hubbard, Essex Hybrid and other varieties from a pruned vine, when those left to run wild only bore two or three perfect speci-

mens. After the pruning is complete it is well to cut off all late fruits and give the early, well developed specimens a chance to make all the vines will produce. By this method the yield can be more than doubled, and the farmer who tries the experiment will always plant a patch to squash.

JOEL SHOMAKER.

THE TODDY TREE.

Nature has her rum shops, her saloons. She produces plants which devote themselves to the manufacture and sale of intoxicants. The South American toddy tree is well known to naturalists. It is well known also to the South American beetle, the *Oryctes Hercules*. When the latter goes on a spree, he never goes it alone, after the unneighborly habit of the human drunkard. He collects his friends and acquaintances to the number of thirty or forty; the whole crowd run their short horns through the bark of the toddy tree, revel in the outflowing juices, and, while inebriated, are easily caught by the human natives. The toddy tree parts with its liquor free of charge. There are other plants which are less generous. They exact no less a penalty than the death of the unfortunate drunkard. And what do they do with the body? Strange as it may seem, they eat it. In this manner they obtain the food which nourishes them and sustains their healthful existence.

At the end of their long green leaves these plants have a pitcher shaped receptacle. We might style this the growler; but it never needs to be rushed. It is always full of what with special appropriateness might be called bug juice—a watery liquor, sweet to the taste and inebriating to the senses. Only in fine weather is the growler open for business. On rainy days it is firmly shut up to keep out the rain that would dilute and spoil the contents. Nature's saloon keepers do not water their stock. —*Lippincott's*.

PULSE OF THE IRRIGATION INDUSTRY.

A GOOD LOCATION.

According to the descriptive folder that has been issued by the business men of that section, Milk River Valley, Mont., is a very desirable location for prospective settlers. Precious metals and timber in the immediate vicinity, together with the fine opening for irrigation farmers and live stock growers, offer flattering inducements to settlers. The valley extends from Havre eastward 180 miles to the Missouri river, its average width being about two miles. The average altitude is about 2,200 feet above sea level, and the climate is fine, the winters being shorter and the snowfall less than in the lake states. It is supposed, from the nature of the soil, which is a very fertile loam, commonly called "waste" or "made" soil, that Milk River Valley was once a river bed, as in this way only can its extreme fertility be accounted for.

Milk River Valley is one of the many examples of what irrigation will do, and how successful the co-operative plan may be. The farmers formed a stock company for the purpose of building a canal, each stock-holder paying his share of the expenses or assessments which were small, and doing his proportion of the work necessary in making the canal. The largest canal, the Fort Belknap canal, is a stock concern, owned by ninety farmers. The main ditch is twelve miles long, with three branches aggregating eight miles, making twenty miles altogether and covering 16,000 acres. The water is taken from Milk river. The next largest canal is the Harlem, eleven miles long. Paradise Valley Dam is another co-operative concern and it, too, takes water from Milk River and irrigates 6,000 acres. North Fork Ditch, taking its water from North Fork Creek, is another canal and there are many others in process of construction.

The methods of irrigation in use in the valley are the flooding and furrowing sys-

tems, the former being used for hay and grain crops and the latter for vegetables and garden truck.

The report to the department of agriculture, made by R. J. Hinton, agent in charge of the office of irrigation inquiry, contains the following:

"The valley of Milk River, in the northern part of Montana, forms a valuable body of agricultural land. It was advertised one wet year as cultivable without irrigation, but settlers who have gone on do not find that to be a fact, as a regular thing.

Indeed it can not be too clearly borne in mind that within the arid region all land to be fit for cultivation must have access to water, either by artificial application or from natural sub-irrigation sources. Throughout this region, wherever necessity has compelled experiment, phreatic waters have been reached at a depth of from five to twenty feet below the surface."

Prof. S. M. Emery, Director of Montana Experiment Station, speaks highly of Milk River Valley as a suitable location for settlers of moderate means, claiming that any settler of energetic and economical habits can make a living on 40 acres there. Co-operative canals are, in his judgment the best kind, as the management and control of them is thus vested in the ones who use the water.

Any one desiring to make a home for himself would do well to investigate the resources of Milk River Valley before deciding upon a location.

MONTANA SOCIETY OF ENGINEERS.

The regular monthly meeting of the Society was held in the Society's rooms in Helena, June 11, 1898. Second Vice-President F. J. Smith called the meeting to order soon after 8 p. m. After the reading of the minutes of the previous meeting Mr. Walter Harvey Weed, U. S. Geologist, was introduced, who delivered a lecture upon the geology of Butte. The lec-

ture was illustrated with maps showing the geological formations. Besides surface examinations, the geologists availed themselves of the splendid opportunity offered of examining the geological formations to the depth of hundreds of feet below the surface in the numerous mines in Butte. The geological surveys in Butte have contributed information of very great value in mining operations. He pointed out the position of several extinct volcanoes and the boundaries of a former lake extending from Butte to Dillon. After the lecture he answered numerous questions upon the geology of Butte.

The field work of the geological survey in the Butte district was completed last July and the results will soon be published in two forms—a folio uniform with those previously issued, which will contain topographical and geological maps, with a brief statement of the geology and mining industry, and which is now ready for issue; and a monograph by the director of the survey, containing elaborate maps, which will enlarge upon the ore deposits of Butte and vicinity, which will be ready for distribution in about a year.

A vote of thanks was tendered Mr. Weed for his address.

At a previous meeting the society had referred the question presented recently by the state engineer of Wyoming, who sought to interest the Montana engineers in a plan for securing the arid lands now controlled by the government to the states in which they are located, to a committee composed of Frank L. Sizer, Paul S. A. Bickel and A. E. Cumming, whose report was heard last night. The report of the committee addressed to the president follows:

“Dear Sir: The undersigned, your committee appointed to consider the question of taking action and co-operating with other western states interested in securing a grant of arid lands, beg to report that they have considered the memorial of the Wyoming state board of control and also a letter of Mr. Elwood Mead, state engineer,

which was submitted to us; and we are of the opinion that it would be desirable for Montana to take such action as Mr. Mead suggests. If our state had a state engineer, it would be his province to consider such a matter as this, and co-operate with other states interested in the movement. Since this is not the case, we think it would be advisable for our society to make an offer of such co-operation and help as may be within its power. We are certainly of the opinion that, in the hands of such a distinguished engineer and able friend of irrigation matters as we know Mr. Mead to be, there can be no doubt but what the action proposed should be productive of some good. The question of detail, as to how this matter is to be carried out, we do not feel able to pass upon at this time, but the idea meets with our approval. If this additional grant of 5,000,000 acres of arid land can be secured for Montana, it will be a new step in the direction of more thorough development of our agricultural resources and protection of the interests of stockmen, and we are inclined to endorse and assist this measure in any way within our power.”

The society accepted the report, but took no further action as it is understood Mr. Mead may visit Montana this year, in which event the question will be considered while he is present. It is undoubtedly the opinion of the society that some steps should be taken to secure to the state its arid lands and it will aid any practicable plan with that object in view.

Frederic Wooster Sherman, manager of the Gold Mountain Mining company, of Bernice, was elected a member of the society.

The next regular meeting of the society will be held in its rooms in the Merchants National Bank Building, Helena, Montana on July 9, 1898, at 8 p. m. Programme for the meeting will be announced at a later date.

A. S. HOVEY, Secretary.

IRRIGATION IN UTAH.

Under the title "Irrigation in Utah," Chas. Hillman Brough has given an interesting volume. In the preface he gives three reasons why the study of irrigation as practiced in Utah should prove of more than local interest; "first, because Utah is the geographical center of the arid region. Second, because, both co-operative and capitalistic methods have been applied in the reclamation of land in Utah, and an opportunity is afforded for comparing the results of the two methods. Third, because problems applicable to the arid region as a whole are considered and their solution is attempted."

Utah, is the starting point or birth place of modern irrigation, and as Utah is inseparably associated in our minds with Mormonism, we find that to the hard common sense of Brigham Young we are indebted to the reclamation of arid lands, and learn anew that oftentimes good can come out of evil. For however much we may revolt against the religious system of which he was the founder, we must admire the executive ability of the leader, and the control which enabled him to compel his followers to lead peaceful, industrious lives on their little farms instead of being consumed by the gold fever that proved such a will-o'-the-wisp to many. In the fall of '49 Young delivered his views regarding the gold fields, most emphatically, on one occasion being quoted as saying "If you elders of Israel want to go to the gold mines, go and be damned. If you go I would not give a picayune to keep you from damnation." And such was his influence over his people that few went.

And so, from the days of the Mormon pioneers and their first crude attempt at irrigation, the author leads us to the present time, giving valuable data regarding the present system. Any one wishing to gain an idea of irrigation as practiced in Utah, can get it in clear, concise and entertaining form from this work of C. H. Brough.

STATE NEWS.

NORTHERN MONTANA NOTES.

Weather during the months of April and May was very favorable in many respects for the Milk River farmers and stock raisers. We had frequent showers and as a result the range and hay lands are in the best possible condition, better than for a number of years past. The rain delayed plowing somewhat.

The dams that were damaged during the spring freshets were rapidly repaired and nearly every farmer will be able to irrigate in season.

Messrs. Maney, Clowes, Battles, and Whitehead are now constructing a large flume over Milk River, south of Chinook; which will enable them to water that portion of their respective farms laying on that side of Milk River. This flume means the reclamation of about six hundred acres of choice land immediately adjacent to Chinook.

The Cook Bros. are pushing the work upon their co-operative canal. This canal when completed will reclaim about five thousand acres of very choice land. It is expected to have water for use next season. They are building one of the finest irrigation canals in northern Montana.

So many inquiries came to the business men and others of Chinook that they decided to issue a descriptive folder that would answer the many questions asked. It is now out and any one may obtain a copy by addressing W. M. Wooldridge, Chinook, Montana.

Several train loads of young stock cattle were recently unloaded at Chinook stock yards, and turned loose upon the range.

W. M. WOOLDRIDGE,

Chinook, Mont.

The Mining Congress that is to be held this month at Salt Lake City, Utah, promises to be well attended. Something over 1200 delegates are expected to attend.

WITH OUR EXCHANGES.

MCCLURE'S MAGAZINE.

McClure's Magazine for July will contain an account of the daily personal and official life of President McKinley since the beginning of the war crisis. It will be illustrated with wartime scenes in the White House and the Departments, from life drawings, and with portraits from recent photographs of the men who are managing the business of the war in Washington.

"The First Fight on Cuban Soil" since the beginning of the war with Spain will also be described by Mr. Stephen Bonsal, who was himself an eye-witness of the fight. Mr. Bonsal also took the photographs from which his article is to be illustrated.

And there is an illustrated article by Cleveland Moffett describing his experiences in a voyage on "The Fastest Vessel Afloat"—the famous "Turbinia," which has time and again shown a speed scarcely less than that of the fastest railway train.

THE LITERARY DIGEST.

The Literary Digest of July 2 gives the "Views of Prominent Men on the Policy of 'Imperialism,'" the latter term being but another name for "Colonial expansion." Moorfield Storey, Grover Cleveland, Wm. J. Bryan and Senator Morrill are among those who oppose it. Another interesting article is the "Powers of Congress over Territorial Possessions." A cartoon, reproduced from the Chicago Inter-Ocean, hints that the quickest way for the Hawaiian Island to get into the Union would be to hoist the Spanish flag. Under "Science and Invention" the old and new methods of medicine are compared, and in the religious topics the leading one is "Marriage and Divorce Canons of the Protestant Episcopal Church."

Even to the one who is forced to spend his life in the city; who has no interest in agriculture, the "Yearbook of the Department of Agriculture for 1897" is interesting, as evincing the interest that is being

taken in agriculture by the government and how much is being done to educate and aid the farmer. The Secretary of Agriculture, in calling upon the chiefs of bureaus, divisions, etc., of the Department of Agriculture for contributions to the Yearbook for '97, said he wished them to be "fully impressed with the fact that every page contained in the Yearbook costs the country \$500, and is designed to be distributed to half a million persons. * * * I feel confident of the hearty co-operation of each one of you in making this book the best of its kind ever issued." The result shows his confidence was not misplaced. In addition to the reports of different departments are pages on timely topics by those who know whereof they speak," and illustrations that are remarkably fine.

THE REVIEW OF REVIEWS.

The frontispiece for the July number is a picture of Lieut. R. P. Hobson. A sketch of this hero with interesting pictures is also given. "Porto Rico as Seen Last Month," with maps and illustrations, "Our War Taxes", "The progress of the War" and a character sketch of Gladstone, the latter by W. T. Stead, are the leading articles.

The chief feature of the Australian edition of the Review of Reviews for May is "A Post-card Plebiscite of the Federal Bill" in autograph.

THE FORUM.

Simon Pokagon, last chief of the Pottawattamie Pokagon band of Indians, contributed an interesting article on "Indian Superstitions and Legends" to the July Forum. Among the many interesting legends he gives is the one relating to the origin of the trailing arbutus, their tribal flower. The decree of the German Emperor prohibiting the admission of American fruits and plants is treated of, under the title of "International Relations Disturbed by an Insect," by L. O. Howard. It tends to prove that this was not entirely,

as many supposed, a retaliatory measure, but was designed to keep out the injurious San Jose scale. Among the many other interesting topics taken up are "William Ewart Gladstone," by Justin McCarthy, M. P.; "Does Machinery Displace Labor?" "The Ethics of Modern Warfare," etc.

SCRIBNER'S FOR JULY.

The leading article, by Richard Harding Davis, is "The First Shot of the War," with illustrations from photographs taken by the author. "Manilla and the Philippines," with fine illustrations, is by Isaac M. Elliott. The story of "The Workers" takes us among the revolutionaries, and is of more than usual interest. "The Story of the Revolution" has progressed as far as the "Invasion of Georgia." We find under "The Field of Art" department a bright discussion on the "Combined Artist and Business Man."

The Wine and Liquor Journal says that the additional tax of \$1 per barrel on beer will add to the revenues of the government at least \$35,000,000 annually. The total consumption of malt liquors in the United States last year was 34,462,822 barrels, or 14.69 gallons for every man, woman and child in the country.

ODDS AND ENDS.

A NEW PLAN.

The printers' union of New York city has recently proposed a new plan by which the idle printers may be helped to help themselves. Since the coming into general use of the type-setting machine many printers all over the land have been thrown out of employment and are, therefore, practically destitute, for the old time "print," as everyone knows who is acquainted with the species, never saved anything for a rainy day. There is one bible verse that he has obeyed literally: "Take therefore no thought for the morrow: for the morrow shall take thought for the things of itself. Sufficient unto the day is the evil thereof." He is therefore

thrown upon the charity of his companions who are so lucky as to have jobs. The printers' union in New York city, as well as other cities, have expended thousands of dollars in aiding their companions who are needy, but they have realized that much of this money is wasted or misapplied and they propose to try a new plan. This is for the union to secure a tract of land on Long Island and put the idle printers to work there raising vegetables, poultry, small fruit, etc. It is the only employment open to them and they may in this way become self-supporting. Whether the experiment will result in success or failure only time will tell, but the principle involved is a good one and it is hoped will meet with success. L. W.

IT KILLS THE JACKS.

Australia has found what she has long sought—a means to exterminate the pest of rabbits. The experiment of inoculating some of the short-tailed gentry with chicken cholera and turning them loose to spread the disease has proved a great success. Farmers in the lower part of the San Joaquin valley might do well to try this plan on the omnipresent John-rabbit.

With all the little 2x4 editors through out the country giving advise on the subject, the wise men at Washington ought not to have a hard time deciding what to do with the Philippines.

Phoenix, Arizona, had a disastrous fire a short time since, the loss being estimated at about \$15,000.

The bond issue has become an established fact, though the issue was not as large as was first planned. The bonds went "like hot cakes," and strange to say the small investor had a chance.

Wheat has taken a tumble.

The Weber Gas and Gasoline Co. reports business so good that it is obliged to run over time. This company recently installed another 4-inch Boring Mill, and have numerous other orders booked.

THE SUPER VOLUNTEERS.

We've been the Roman army and we've
 been the Paris mob,
 We've marched with Dave Belasco's
 boys in blue;
 We've fought in "Shenandoah" and we've
 often had the job
 Of assisting in the "Taming of the
 Shrew."
 We're battle-battered veterans of every
 blessed age,
 We can stand before a stage director's
 "damn;"
 But we've made our last appearance and
 we're going to engage
 For a season on the road with Uncle Sam.
 We've rushed across from R. to L., pursu-
 ing empty air,
 We've done some noble slaughter in the
 wings;
 We've fired a thousand volleys on a foe
 that wasn't there,
 And it seems that we are fit for better
 things.
 We want to feel the fever of a realistic
 fight,
 And we want to storm a fort that ain't
 a sham;
 We're sick of being soldiers at half a
 plunk per night,
 So we're going on the road with Uncle
 Sam.
 And it isn't for the glory, and it isn't for
 the pay,
 For none of us expect to be a star—
 But it's just the human longing for the
 madness of the fray,
 It's the longing to be really what we are.
 So we quit the Roman army, and we've
 laid the props aside.

And the stage door shuts behind us with
 a slam,
 And we ain't afraid of dying—for we've
 very often died,
 And we'll gladly die again for Uncle Sam.
 —Dramatic Mirror.

WHAT KERN COUNTY CAN DO.

Through the courtesy of Mr. R. E. Houghton, of San Francisco, Cal., we are enabled to present the illustrations of wheat and barley fields appearing in this issue. In the letter accompanying the photographs Mr. Houghton says:

"In your publication for the month of June, I find a picture of a wheat field on Sunset Colony Lands, produced with a view of showing what can be done in the way of raising grain crops by means of artificial irrigation. As I recently had some pictures taken of some grain fields on a section of land which I have in Kern Co., Cal., which I think will compare with the field which is presented in your June number, and as I know you are interested in such matters, I send you two photographs; one of a wheat field on the Alameda farm, and the other of a barley field on the Berkshire farm, Kern County."

June 21 was Illinois day at the Trans-Mississippi Exposition, and Omaha had one of the largest crowds on record that day.

We are in receipt of a neat catalogue, gotten out by the Witte Iron Works Co., of Kansas City, dealers in gas and gasoline engines. The cover is especially handsome, being of heavy white enameled paper, with the United States and Cuban flags in colors.



ON THE AMERICAN RIVER NEAR FAIR OAKS.

THE IRRIGATION AGE.

VOL. XII.

CHICAGO, AUGUST, 1898.

NO. 11.

THE PROGRESS OF WESTERN AMERICA.

**Remember
the
Congress.**

Every one at all interested in irrigation matters should make a strenuous effort to attend the National Irrigation Congress, to be held at Cheyenne, Wyo., beginning Sept. 1st. This is the seventh annual session of the body, and should receive a large attendance. Joseph M. Carey, Cheyenne, is the president of the association, and the national executive committee has a representative from every state and territory in the Union with the exception of the following thirteen states: Alabama, Arkansas, Delaware, Florida, Georgia, New Hampshire, Louisiana, New Jersey, North Carolina, South Carolina, Vermont, Virginia and West Virginia. Thirteen is an unlucky number and it is hoped that some, if not all, of the above states will "come into the fold" before the next congress. It seems surprising that Louisiana is not represented, as irrigation is quite extensively practiced there, especially in rice farming.

The fact that 36 out of the 49 states and territories are represented is an indication of how general the interest in the irrigation movement has become.

**The Olive
Branch of
Peace**

The dove has been sent forth and is probably searching diligently for the olive branch, but has not as yet returned to the ark with it. Or, in less symbolic language, Spain wants peace but has not fully decided to make all the concessions asked. But the war is practically ended. Sylvester Baxter writing in the American Review of Reviews upon Spanish traits, gives it as his opinion that

"Probably the greatest blessing that can befall Spain will be the loss of all her colonies. They have been the source of all her troubles." If this be true, then her troubles are about ended and the writer may prove a true prophet in saying that "with the passing of Spain's colonial might will dawn the renaissance of Spain."

Like the devastating storm which causes death and havoc but clears the atmosphere and makes the whole world fresh and invigorated, this war, while bringing death and suffering for which we mourn, will clear the political atmosphere and the nations will take a fresh start with a much more vivid understanding of what American independence means.

Among many of the good things this war has brought about—and why not think of them and ignore the bad—is, first and greatest, the unity between the north and south; commanders, who in '61 led opposing forces, now stand side by side in the cause of the same country and under the same old flag. Party lines have been broken down; patriotism, which some thought dead in us, has blazed up and we feel as proud of, and loyal to our country as did the heroes of '76. It has drawn us nearer to England, as evinced by the fact that for the first time England this year celebrated with us the glorious Fourth of July, the memorial of the loss of her American colony. Perhaps, when one hundred and twenty-two years have elapsed Spain will join with us in celebrating the independence day of Cuba. "Time heals all wounds," and the courtesy and kindness

Spanish prisoners have received at the hands of the victors should be such a revelation to them of American character as would make them give up the prejudices they have held against us. And, lastly, we have proved to the powers of Europe that the eagle can, if necessity arises, leave his perch and join in a free fight with the other animals. The nations who have heretofore regarded Uncle Sam as a money-making boaster have learned that the old gentleman can do most anything that he turns his hand to—even to getting up a navy on short notice, and they have a wholesome respect for him in consequence.

The Day of Small Things. A school friend once wrote a few verses beginning "Little things they count, yes, you bet they do." While the grammatical construction of this might be improved, and while the poetry is conspicuous by its absence, the truth of it none can gainsay. Truth crushed to earth, even under such poetry, rises again. The greatness of little things is also brought to notice in that familiar piece concerning the horse-shoe nail. The Hawaiian annexation brings to light another example of the weight of little things. Five years ago the treaty providing for the annexation of Hawaii was agitated, but not until the war brought home to us the necessity of having the island, was the treaty ratified. And what was one of the chief "little things" that stood in the way all these years? Nothing more nor less than a sugar-beet, probably not more than four or five inches in length! By experiment it had been proved that the sugar beet could be profitably raised

in this country and farmers began turning their attention to the raising of this vegetable when they were alarmed by the rumor of Hawaiian annexation. It was the death-knell of the sugar-beet industry, they supposed, so they fought against the bill, tooth and nail, on the plea that if Hawaii were annexed her sugar would be too formidable a rival against beet sugar for the latter to withstand and thus the American farmers would be the sufferers. So the little sugar-beet arose in the land and gave voice, through various agricultural publications, to its woes and the annexation was deferred. The Dingley tariff, it is claimed, has a sugar schedule so favorable to the beet sugar industry, that Hawaiian sugar will not be the rival that it was feared.

The Fifty-fifth Congress. The session of the fifty-fifth congress which adjourned July 8, was a most remarkable one. In addition to the legislation necessitated by the war—the appropriation of the fifty million dollar fund, the appropriation for naval construction, and the reorganization of the army upon new lines—there was passed this session a law prohibiting American citizens from killing fur seal in the North Pacific and granting Great Britain the indemnity asked for the detention of Canadian sealing vessels; the Hawaiian annexation bill was passed, and after long years of discussion, a national bankruptcy law was enacted as one of the closing acts of congress. This law is intended to benefit business men who became deeply involved during the recent panic and who now desire to take a fresh start in business life, unfettered by past indebtedness.

REVISED VERSION.

The Spanish cavaliers have met with defeat

At the hands of the brave boys in blue,
sir.

The guns of our fleet seemed oft times to repeat,

"Remember the Maine and her crew,"
sir.

L. WING.

IRRIGATION IN WASHINGTON.

JOEL SHOMAKER.

The state of Washington occupies the northwest corner of the United States and comprises an area of 69,994 square miles, or about fifty million acres. No similar division has such unlimited water expanse, of ocean, lakes and rivers, there being not less than fifty rivers in and on the borders of the state, making a shore line of 1800 miles. The Cascade mountains, trending north and south, divide the state into two sections—the western having an abundance of rainfall at all seasons, the eastern the land of irrigation. Between these natural divisions are some of the most lofty and picturesque mountain peaks in the world. The altitude reached by Mt. Rainier is 14,444 feet while Adams, Baker and St. Helen's average about 10,000 feet above sea level. The rainfall along the coast and throughout Western Washington ranges from 60 to 100 inches annually, while east of the Cascades, it runs from 9 to 25 inches, varying with location and altitude.

Washington was admitted as a state Nov. 11, 1889, and in 1890 had a population of 347,788, of which 1,602 were colored, chiefly Mongolians residing in coast cities. Wheat and oats are the principal farm crops of the state in general, but the growing of hops, fruits and vegetables, increases every year and smaller areas are being cultivated as the large ranch and range farms are giving way to the modern intensive methods of soil tillage. The hop yield is probably 10 million pounds yearly, the average being about 1600 pounds per acre. Some hop raisers harvest over a ton from an acre and get from ten to twenty-five cents a pound for the crop. The prices fluctuate with all other business and the grade generally determines the value. Wheat averages 40 bushels or more per acre, with barley and oats proportionate crops. Truck farmers and gardeners claim 10 tons of grapes, 5 tons of strawberries or blackberries, or 3 tons of raspberries, with other fruits similarly productive, the crop of an acre. These products sell at from \$200 to \$600, according to the market demands, earliness of picking and neatness in packing.

Eastern Washington is frequently referred to as "The Inland Empire," and is noted as the great wheat growing region of the rich northwest. The wheat capacity of this rich lava soil section is estimated at 200 million bushels annually, and some farmers boast of threshing 75 bushels from an acre. Much of the grain is grown by the dry farming method, the farmers depending upon early rains, dews and sub-surface water to furnish sufficient moisture for maturing the cereals. But the practical application of soil moisture, through irrigation, is the potent force that will certainly be employed in the fertile Columbia River Basin

and throughout all of the state east of the Cascades. Many mutual farm ditches are in use in Yakima, Kittitas, Asotin and other eastern counties and the spirit of irrigation is extending to all sections within the semi-arid boundary. Artesian wells are numerous and small streams are utilized almost everywhere, especially where gardens or orchards are desired. The mist and dews from the Japan current or Chinook winds furnish some moisture in favored spots, but do not reach all sections.

Washington has fifty cities and towns, with population ranging from 300 to 50,000 people, and numerous villages, ranches and country districts. The inhabitants are thrifty, honest and typical westerners, engaged in farming, mining, manufacturing, fishing, lumbering and general vocations incidental to these industries. Nearly every part of the thirty-three county divisions is reached by railroads or steamers on the rivers or ocean. There are almost 3,000 miles of railroad in the state, being 75 miles to every 10,000 population. The railway mileage, according to number of inhabitants, is exceeded by only nine states in the Union, thus showing that capitalists have not hesitated in placing investments in Washington. Every market is easily and quickly reached, and the farmer has the advantage of inland trade, through the trunk railway lines of the Oregon Short Line and Northern Pacific and branches, and the waterways of the world on the great Pacific steamers. Not less than fifteen hundred vessels touch Puget Sound yearly and carry away five million dollars worth of products of lumbering, fishing, farming and manufacturing.

Irrigation is possible and practicable in all the fourteen counties that make up eastern Washington, and wherever applied, has produced most astonishing results over the mist and dew farming. Opportunities for canal construction, reservoir building, and artesian well sinking are numerous, and some excellent works have been completed. One of the more recent enterprises is that of Vineland in the Lewiston Valley, in Asotin county, where the desert has been converted into an almost semi-tropical paradise by the application of water through a corporation canal. This valley is less than 100 feet above sea level and has many possibilities in fruit growing and truck farming yet undeveloped. In central Washington the thriving city of Ellensburg stands out as an oasis in the desert, a perpetual monument to the handiwork of irrigation, in redeeming the native land from its primitive aridity and making it produce abundantly of the fruits of the field, orchard and vineyard. North Yakima, Walla Walla, Palouse City and other equally important points of eastern Washington, are surrounded by evidences of prosperity induced by irrigation.

According to the official census reports for 1890, Washington had 18,056 farms, of which 16,529 were cultivated by actual owners, and 986 rented for part of the crops grown. The small farm ratio is increasing very rapidly, and at this enumeration, there were 1,236 farms of less than 50 acres, 1,715 having over 50 and less than 100 acres, and 13,907

containing over 100 and less than 500 acres. The farms of 1,000 acres or more numbered 308 and those rented for cash were 541. In round numbers, the valuations were: For land and improvements, 84 million dollars; for implements and machinery, 3 millions; for live stock, 14 millions; and farm products for the year, 14 millions. The acreage planted to various crops was distributed as follows: Barley, 51,551 acres; corn, 9,583 acres; oats 65,089 acres; rye, 1,763 acres, and wheat, the chief crop, 372,658 acres. The productions in the census year of other crops were: Potatoes, 1,445,018 bushels; sweet potatoes, 2,535 bushels; apples, 295,196 bushels; apricots, 3,856 bushels; cherries, 11,692 bushels; peaches, 63,497 bushels; pears, 26,868 bushels, and plums and prunes, 66,909 bushels.

The cost of clearing land and preparing for irrigation in eastern Washington is estimated at from \$5 to \$10 an acre, the price depending much on location and whether the tract be on the benches or bottom lands. In the western part of the state the dense timber and brush of vine maple and other growths, due to abundant moisture, require considerable time in clearing and burning, but it is customary to raise about two crops before the fields are plowed. The soil is generally a sort of decomposed lava, very deep and fertile and produces most wonderfully of root crops. One man up in the Puget Sound country says: "Carrots completely fill the soil, parsnips grow to great depth, three feet being no unusual length, turnips soon become too large for table use, and sometimes attain a circumference of three feet and weigh from 19 to 25 pounds." This may sound unreasonable, but the statement is true and applies with equal force to the growth of onions, cabbages, cauliflowers, celery, tomatoes and other vegetables, in the river bottoms of almost every section.

No correct estimates as to cost of irrigation canals and annual maintenance fees can be given, on account of the various sources of supply and general mutual or co-operative ditch system. Some farmers reckon their actual ditch cost at \$2 to \$5 an acre, others give as high as \$15 as the first cost, with annual expense for repairs of from ten cents to two dollars an acre. As a general rule the neighborhood ditches cost the users about 50 cents an acre yearly but this has exceptions of less and more expense. The prices of land under cultivation vary from \$10 to \$50 an acre according to location and improvements. About one half of the state remains open for settlement, and land can be entered under all the laws of the general government or purchased from railroad companies at very reasonable figures. There are but few original homesteads offered for sale, except possibly some portions, to reduce the land holdings to more reasonable proportions. A prominent farmer at Ellensburg expresses the usual sentiment when he says: "I am perfectly satisfied and will live and die here."

Stockraising is an important auxiliary to irrigation and a most valuable farm assistant in Washington. The mountain slopes are covered

with a luscious bunch grass that furnishes feed for horses, sheep and cattle all the year round, and alfalfa, corn and roots can be grown so cheaply that one of the safest and surest methods of making the farm pay is to market its products in meat and wool. Sheep pay handsomely everywhere throughout the west, and in Washington there are over one half million head, shearing an average of 7 pounds of wool each, and increasing at the rate of thirty per cent annually. The farmers have about 100,000 hogs and double that number of horses and mules, all of which may feed outdoors without expense, throughout the year. The income from a million fowls aggregate an immense sum every year, and yet these valuable domestic farm appurtenances are kept at almost no expense, on account of the natural food products growing everywhere.

An eastern correspondent who is somewhat of a moralist, files a general objection to irrigation and irrigated countries, on the ground that man loses all reverence for a supreme being, when he feels that he is not dependent upon prayerfulness for rain to mature his crops. That argument certainly can not apply to Washington because there are 392 church organizations, having 532 edifices, costing over two million dollars, being patronized by 58,798 members. Some of the finest church buildings in the state are in the eastern or irrigated section. All the prominent denominations are represented, the exact membership of the leading ones being as follows: Catholic, 20,848; Methodist, 12,697; Baptist, 3,941; Presbyterian, 4,343; Lutheran, 1,912; Disciples, 5,816; Protestant Episcopal, 1,698 and Congregational, 3,154. Education is not neglected as some suppose, as there are 1,844 teachers with 60,194 pupils enrolled, with numerous modern school buildings. Books of a sectarian character are excluded and three months compulsory attendance is required of pupils between five and twenty-one years of age.

Irrigation is in its infancy in Washington and farmers have many things to learn about the making of ditches, utilizing water supplies and proper application of moisture. The presence of dews and occasional summer showers supply enough moisture to grow some crops, but wheat, oats and grasses usually demand one period of irrigation and in extraordinary dry seasons require two applications of water. Potatoes frequently grow too large, with holes in the center, or take on a second growth if irrigated more than once, hence the necessity of exercising the greatest caution in supplying the requisite moistures. Every man cannot succeed as an irrigation farmer. Irrigation is a science that must be thoroughly studied and properly understood before its practice will be of material assistance to the man who has been trained up to depend on rainfall. Washington is a state of great possibilities in agriculture when modern irrigation methods shall be generally adopted and the science practically handled.

UNPROFITABLE IRRIGATION.

NO. III.

BY T. S. VAN DYKE.

THE stupidity of many landowners who think some one else will invest money to make their property worth several times what it was, without their contributing a cent or an acre, and patiently await the settlement of the tract at the high prices asked by the land speculator, has been a fertile cause of the discredit into which irrigation works as an investment have fallen. The land owner can rarely learn that this is one of the most dangerous of all ways of trying to get something for nothing. He will not stop to inquire whether any one else has ever made any money in that way, and years of waiting in the path of progress will not teach him that he would do better to try and get somewhere before he dies by recognizing the fact that water costs money, that capital must have interest, that settlement is slow, and that the annual payment must be set low or it will not only be a burden to the irrigator but a bar on the transfer of the land in case he wishes to sell.

Next to this stupidity comes that of the companies themselves. Much capital has gone blindly ahead in the past and built expensive works, thinking that the land owners must have water and would buy it, when they could have learned twenty years ago that such confidence in sweet human nature was almost certain ruin. Others that have secured land enough by exchange or purchase, or the desert land act, which the taker has to buy water for in some way because he cannot make his proof without it, have rushed as wildly ahead because they thought they had a fine project. The world needed it, therefore the world would scramble for it. It takes half a lifetime to learn that it is the easiest thing to produce a first class article that the world needs and should have but which, nevertheless, the great pigheaded world don't want, or don't want just now, but will call again. The surest way to outwit the world on this, is to force it to see the beauties of your proposition, not with high-flown words, a grand prospectus, glib-tongued real estate agents or stereopticon lectures a thousand miles away, but by deeds. Instead of prating of smiling skies make the land smile for itself. Then your smiling real estate man can smile to advantage.

It is very seldom that a company has sense enough to do this and when it does it has still less sense about the way to do it. A year after the building of the Sweetwater dam I found the settlers at Chula Vista, the new settlement under it, in the depths of despair. They were starting in to work out the problem of irrigation anew for themselves just as if no one in California had ever tried it. They were making the wretched muss that is generally seen in such cases and when I told them they

were making a failure they asked me to come down and give them some lessons. They got up a meeting at the school house one night where I explained the whole thing on the black-board and the next day they started in anew. In a year they had things looking so well that the company began to imitate them by improving some of its own land in the same way. In two years everything was so fine that the company became sure its land was worth as much to plant as to sell, began extending its area and now has a fine lemon orchard of a thousand acres, probably the largest in the world.

Suppose the settlers had struggled along for years working out their own knowledge, how much would the company have done to help demonstrate that the land it was so loudly trumpeting was worth anything? Suppose the company had started in at the beginning to get some of the best irrigators in California and paid them well to make a demonstration. There was at that time quite a run of land-buyers. Hundreds came and looked and picked their teeth over the luncheons provided at the excursions and nodded approval at everything the agents said and thought the pamphlets were well written and the pictures very lovely and all that. They then bowed good day, went north a hundred miles and paid higher prices for land that was no better in any respect but which was in an older country where people had made a beautiful success of handling water. Any one ought to know by looking at such land that it would do so and so, because so and so had been done a thousand times on exactly the same land elsewhere under exactly the same conditions. Nevertheless the great stupid world does not reason that way. It may believe in such things in the abstract when there is no question of buying involved. But when laying down hard earned money poor human nature, when there is no boom on, wants to see with something stronger than the eye of faith. And this is about the last thing any company ever provides. In two companies in which I have had an interest all the arguments I could bring to bear were unavailing. In the very few in which I have known any thing done it was disgracefully done and in some cases made matters worse than if the land had been left alone. In most cases it has been mere reckless planting of trees without any judgment even as to variety, but done solely to make a temporary show to catch some tenderfoot and make him believe he was buying a place already improved. Such a thing as an attempt to show in the best manner that your game is worth taking a hand in I have not yet seen or heard of.

Why is it that men can be so foolish when they have so much involved? One reason is that irrigation works like most all big things in new countries, are rarely projected by men with the means to finish them. They are almost always worked up to a certain point by promoters. Capital comes snuffing around later on if it comes at all but it generally waits to be coaxed. Now a promotor to be of much use must be an enthusiast, a "rustler" and a big talker. This makes him a gold

spike operator. If some one will furnish the spike and Jupiter furnish the thunderbolt of a boom to drive it with he can hold it under the hammer in great shape. But when the boom is gone and things settle down to a matter of "brass tacks" with which the great business of the world is in the long run done, your smart promotor is of little use. He can't stop to bother his great brain with such things but still scours the stars in the chase for that inevitable recognition that awaits all good things. In some cases the immediate cultivation of the soil with the first water brought into the ditch would be the salvation of the company and it could well afford to give forty acres, water and all free, each year to the man who made the best showing. But I have never known it done. The owners are too busy with hotels, railroads, townsites, water-powers and will not stoop to such trifles. In almost every case the plainest prudence dictates that no one should be allowed to touch the soil in a new proposition unless he does it right. Yet they allow any blockhead to go in and flood land, ungraded and unchecked, at will in the old Indian style and make a showing that will drive away the next one that comes. They are too busy with inside intrigues or struggling for control, or working up some stock deal to bother with such "minor details" as that. Such matters they call "minor details" unworthy of the attention of great financial genius. I have been unable to make any associates in any enterprise listen to advice of this kind and it will probably be thrown away forever. But I have seen many of them lose money by it and have lost some myself through their stupidity.

Many of her companies have brought great discredit on the business of building irrigation works by the manipulation of the stock, or assets of the company in outside "deals" of some sort connected with it. In most cases these are legitimate parts of the business but those who embark in them get wild, they think they can stir up a cyclone and ride it safely into port, but they don't know when they have sighted land. Not one in a thousand has sense enough to quit before he has swamped himself and crippled the company. One of the finest water propositions in the world, one of the surest and safest, requiring very little money to build and with the best market on earth for water lies a wreck today as it has for years through such work and no one can see exactly where the present owners, who got it apparently cheap enough, are to make anything out of it. This was without any inside quarreling or attempts to "freeze out" the smaller stock holders, but was simply too great an expansion of ideas that in themselves were sound enough. "Freeze out" games are of course another fertile source of trouble but I am dealing now only with those troubles that arise from fair dealing, deadened by stupidity or addled by to lofty a flight into the stars.

Another common result of having "the biggest thing on earth", which almost every water proposition is to its projectors, is that it must be immediately and fully completed. It is too great and grand to wait or to move by slow and easy stages, feeling its way along by safe steps.

It is also too great and important to the world to have any cheap work about it, or make shifts of any sort that would save interest while the slow settler is deliberating about whether he will buy or not. Every thing must be done in the best style and all at once. In most cases works must be completed on a large scale or people will have no confidence in there being a solid settlement under them. In many cases it is cheaper in the long run to build more expensive works. But there are also many cases where neither of these is the case and a start can be made on a safe basis and the work kept on it. People will argue for instance that there should be iron pipe or ditch of cement and stone because flume is not durable. They are not thinking of the durability of interest which works nights and Sundays. If you had all the water sold and paying its annual payment at the start, as in case of supply for a city, it would in most cases be best to make the works as durable as possible at the beginning. But where there is no revenue assured, and especially where its absence for many years is assured and the work is built on borrowed money, the end is not far off.

It is common to blame engineers for works that are too expensively built. But an engineer is only human, like any one else, and has among other things to retain his job. The proprietor of "the biggest thing on earth" has no thanks for any one who does not fully agree with him about its importance and especially the small amount of money it will cost. He does not want to be taken behind his rainbow where he may find some drizzling mist about it. He wants his engineer to stand off and contemplate it from his standpoint and there is generally but one result of being independent enough to cross him. I have lost two jobs that I know of by being a little too quick to say that something could not be done for so much money and I have known others dropped for the same reason. An engineer also feels a pride in seeing his name on a fine piece of work and if the owner is prepared to foot the bill with pride there is no special reason why the engineer should feel bad about it.

But in most cases where works are made unnecessarily expensive the builders are wholly to blame, no matter what the advice of the engineer. One need not be an engineer to see that building an iron aqueduct instead of a wooden one is simply betting that the proposition will be a big enough success to justify the difference. Most cases of expensive construction are of this nature, and many works have been so crippled in that way that a complete reorganization with almost a total loss to the old stockholders will be the result. Big notions have ruined them just as they do men.

There are however faults of expensive construction for which no one is to blame. The combinations of circumstances that enter into a large water enterprise are so numerous and shifting that it is not possible for any engineer to make estimates very close. Unless he has sat upon the board of directors and seen something of the inside management of companies he knows little of contingencies. One who has done so is generally

sufficiently amused and retires from the field, so that there are few of sufficient experience in many enterprises to see all the snares that lie along the path. It is therefore the custom to make estimates of the work for what it can reasonably be done under ordinary circumstances and then add fifteen per cent for contingencies. It is far safer to double the estimates and then allow fifteen per cent off for possible good luck with contingencies. For first, last, and all the time, you can be sure that every contingency will *continge*. No man can foresee them all or anything like the quarter of them, especially the cost of litigation.

Estimates too are generally based on the assumption that the cash is on hand. It is very seldom that the projectors of any irrigation works have the construction coin in bank. In old countries like England or France people would rarely think of building such works unless they saw the money within reach and in many of our older states it would be the same. But in our newer west it has been quite the reverse. Capital has rarely done anything with a new proposition until it has been "exploited" by promoters. Often there are several sets of these, each set thinking it has the universe by the hair. The result generally is that the money had to be "rustled" piecemeal. This is certain to increase the cost very much in so many ways that it is impossible to estimate it. If you are behind in payments to the men, no matter how much confidence they may have in the ultimate outcome, or how willing they may be to wait, there will at once be a falling off of from thirty to fifty per cent in the efficiency of their work. And until you can pay them it is difficult to discharge any that may be making trouble. High interest, compound interest, sacrifices of various kinds, sales of water and land for less than cost and a score of other shifts are the general effect.

Many works have been made more expensive by trying to use cheap engineers. If a man uses a transit the world thinks him only a surveyor. But let him set up a level which is far easier to learn and to use he is at once "Civil Engineer." The world thinks this means of course hydraulic engineer and consequently irrigation engineer. When there is much railroad building there are scores of cheap levellers who are out of a job as soon as it stops and most all of them swing a sign Civil Engineer. Most of them are very competent levelers and they cannot be blamed if any one infers from that that they know all about everything connected with waterworks. They try to qualify themselves generally as fast as they can because they have ambition, but having had no experience they cannot plan or estimate large work as it should be done. These men are often given charge of important work because they are cheap. The good salaries often go to the brother-in-law or son of the big bug of the concern and everything else must be cut down to fit.

Even where competent engineers are in charge many of them know nothing of irrigation, cultivation of the soil, or the requirements of a water system. The builders know no more and seem to think all that is necessary is to get so much water on so much land and the world will

scramble for it at once. The combination must be a very fine one to make the world rush for it fast enough to save it if interest is on its trail. And men who have shown great genius in building a work through great difficulties may sit paralyzed when it comes to realizing on it. They don't know enough about land, or irrigation, to show any one else, or to convince any one that they believe what they are talking about. They have built perhaps a work that may some day be useful but not today, something that the government or state should have built or somebody wishing to tie up money for a child. The principles of hydraulics, all that is found in books can be mastered by any one who is a good student and has his mind in training in six months. In two years he can get on his finger's end all that is necessary to know in that way and master all the avenues to the pigeon hole knowledge which forms the greater part of it. But no one in any such time can master the far more difficult problems of how to make works pay, how to lay them out from the start so that they will be built no faster than needed, so that there will be no squandering of the assets leaving an empty shell for capital to look at, above all to keep from building that most easy of all things, something the world don't want. To meet the infinite questions arising takes years of experience in similar work, knowledge of irrigation, land, cultivation of the soil, water law, land law, colonization and selling land and a hundred other things. At the head of a company should be a thorough business man who knows how to say no as well as the head of the soundest bank. Such is rarely the case and any child of shoddy who has had a sudden lift from fortune thinks himself, or his son in-law under his nominal supervision, fully able to manage it. Some influential person who is not afraid of the spade and the hoe should be at hand to take charge of all the first development if done by the company as it should be. For there is no way to get work out of men like working with them and showing that you know what you are talking about. The same person should stand over every new settler with a club and see that he does not make a sorry mess of irrigation.

Some works have been crippled by trying to dispense with engineers because the work seems so simple that they are not needed. What is known as a "practical man" as distinguished from an engineer may often build a very good ditch, many a carpenter can build as good a flume alone as with the help of any engineer, and many a pipe-man may lay out a pipe line well enough and lay the pipe in good order with no supervision. Nevertheless it is not good policy to rely on such people. They do not feel the responsibility, do not do the thinking, have not the ambition, and cannot have the breadth of knowledge necessary to handle with safety a work of any magnitude. There are indeed almost no problems in building our modern irrigation works that can be called "engineering problems." Nevertheless there are a great many questions, dependent one upon another, and requiring proper solution to keep the whole chain from being weak. To expect a specialist in any one branch to manage all

these and especially to think them up before they are sprung upon you when you are totally unprepared is too much. To do this requires a man of brains and wider learning, a student who knows how to look up what he does not know and, above all, one who is not too lazy to do it. For this none but a good engineer can be relied on.

There are many other causes of failure such as squandering money in hotels, townsites, colleges, railroads, and what not in the attempt to force settlement. Such things are in the nature of a dangerous gamble. It is a bad scheme to start with that requires anything of the sort. A settler of sense will want to know first what your soil is and what can you do with it. If there is anything in it that will justify the building of a ditch to irrigate it why is not the company or some one interested in it making some of the money they are inviting the settler to make out of it? Many a ditch has failed because it should not have been built. Any one who understood matters thoroughly could have told that land in that locality would not justify water at that price. But having built it the last thing to do is to spend any more on "Jim Crow" boom appendages. A few dozen acres devoted to intensive culture of the very best kind will do more than all of them. A few thousand put in alfalfa or something else with a handsome bonus to such settlers as do the best work each year will pay interest quicker than a big school house. Promotors of waterworks often think they must put on a certain amount of style just the same as a private person if he wants to do business. If one can afford it it does often pay, but for one person who cares where you live, what you eat or how you dress there will be near ninety-nine who will inquire whether you keep your word and pay your debts. It is much the same with waterworks. What is there back of all this that I can make some money out of, or at all events a living, is the question the great majority of the settlers will ask themselves privately. And big words will not serve for an answer.

A MONEY-MAKING PASTIME.

BY I. A. BARNES.

We show in this issue a couple of scenes from a point in the Southwest, down along the Rio Grand, illustrating what might be called a little pastime of a young fellow down there.

The young man is a clerk in a banking house and wholesale merchandise establishment, and last spring he took a notion to have a little diversion from the routine city fun by renting a piece of ground about four miles from the city and see what he could accomplish in the agricultural line



of mornings and evenings outside of office hours. He obtained a piece of land at a very small rental with an option of buying the tract later on, and erected a little adobe house. He then secured the services of a man of all work who is able to get up a good, substantial, though plain meal and who could occupy himself the balance of the time with work in the garden.

The first thing was to clear off the ground, as it had never been under cultivation before, and in one of the scenes the reader can see what has been accomplished in this direction. In the foreground of the picture will be seen a nice lot of onions growing, while beyond can be seen

the sweet potato ridges, etc., extending back as far as the underbush and trees. The other engraving shows the "suburban residence" of the young man with its rather wild and undeveloped surroundings.

Our young friend is fond of out door exercise, and, with his bicycle, he makes the trip from office to his ranch in about 25 minutes—just a nice little spin; and when he walks into the office in the morning after his invigorating ride, he feels like a fighting cock and in good trim for the day's work. He hasn't that languid, sleepy, out-all-night air about him, and delights in poking his fellow clerks in the ribs to stir them up



as he passes by, perhaps inviting them to come out and put on the gloves for a few rounds.

As to the financial part of it, he finds that the groceries, etc., for himself and hired man do not amount to any more than he would pay for his breakfast and supper if he were living at one of the restaurants in the city, and the morning and evening exercise with the hoe and spade taken with the plain but substantial food, gives him a set of muscles and physique that is the admiration of all his fellow clerks and friends. When winter comes, he will again take up his residence in the city, and the proceeds from the sale of his onions, potatoes and other things that he has raised will furnish him with all the spending money he may require for the theatres and other attractions of city life.

The example is worthy of imitation by other young fellows who are

similarly situated, and they may rest assured that the exercise, etc., will put such life and spirits into them that their employers cannot help noticing the improvement in their general manner as well as ability to do more and better work than before.

Next year we hope to be able to present some photos showing the advancement that our young friend has made with his agricultural enterprise, and we feel pretty certain that they will be admired.

HOW DOES IT SEEM TO YOU?

It seems to me I'd like to go
Where bells don't ring nor whistles blow,
Nor clocks don't strike, nor gongs don't
sound,

And I'd have stillness all around—

Not real still stillness, but just the trees'
Low whisperings, or the hum of bees,
Or brooks' faint babbling over stones
In strangely, softly tangled tones.

Or maybe a cricket or katydid,
Or the songs of birds in the hedges hid,
Or just some such sweet sounds as these
To fill a tired heart with ease.

If 'tweren't for sight and sound and smell,
I'd like the city pretty well;
But when it comes to getting rest
I like the city lots the best.

Sometimes it seems to me I must
Just quit the city's sun and dust,
And get out where the sky is blue.
And say, now, how does it seem to you?

EUGENE FIELD.

THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs, Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

SHEEP AND ALFALFA.

The range sheep business is at present the most profitable industry in the Rocky Mountain States and throughout the West generally. This legitimate farm assistant has been practically separated from agriculture and become a distinct investment, so much so that the average farmer regards a sheepman as an enemy instead of a part of the new diversified system of soil culture. Sheep are herded upon the public domain, with no rental except in some states where a grazing tax is imposed, and as now managed are of no benefit to the cultivated area. The farmers should be the sheep owners and could easily double their annual profits, and remove many of the objectionable features of the present system, by combining sheep and alfalfa growing.

Sheep run wild over the mountains, destroying the young vegetation and under brush, and tramping out the natural reservoirs for holding the rains and snowfall from which irrigation water is obtained. Men wander about in a semi-civilized manner guarding the flocks from many possible dangers of losses from separation, thieving and prowling animals. Many of the herders become deranged in mind and crippled in body while amassing wealth or striving to gain food and clothing for their families. The water for culinary purposes is often fouled by dead carcasses left in the streams or the erection of dipping vats and bedding corals near the banks. Disease makes ravages upon the flocks because of short feed, poor camping places or neglect, and yet the business represents investments of millions of dollars and pays from twenty to forty per cent profits with present prices.

The farm is the place for herding and

feeding sheep, and alfalfa the cheapest and best crop that can be produced for feed. This plant grows anywhere that a little moisture can be obtained, and will produce from two to six crops every year for an indefinite time after a stand is secured. Sheep will thrive upon the green crop and keep fat through the winter on the hay. The fenced fields would soon be fertilized for producing better crops, the noxious weeds be destroyed and sufficient income derived to make all necessary repairs and improvements by each farmer keeping a small band of sheep. Under existing conditions a flock of 2,000 herded on the mountains costs about \$2,000 a year and yields an average of six to eight pounds of wool, with an annual increase of about one-third. Thus the income is practically double the expense, when wool is worth 15 cents a pound and mutton sheep \$2.50 per head. The wool is better and heavier and the sheep more saleable at increased prices where the flock is fed and cared for as farm animals.

THE TOBACCO PLANT.

Tobacco is a useful plant that should be grown on every farm, or in the garden as an ornament and for the many beneficial purposes to which the cured leaf can be converted. The stems are good fertilizers and will keep insects away from fruit trees if piled round the roots to the depth of a foot or more. Leaves may be put in hen's nests and sprinkled round the coops for destroying lice and nits. The fumes of burning tobacco will kill plant lice on house flowers and disinfect a room better than any prepared articles of commerce. When boiled and mixed in water the nicotine will cure sheep scab and all skin dis

eases of horses and cows. The fine fibers of the leaf when moistened and bound on a fresh wound will give instant relief and assist in healing bruises.

This plant is easily grown in temperate climes, and if it does not cure so well as in Kentucky, its value is not depreciated. The seed may be purchased from any dealer in field seeds, at five cents a package, which will produce several hundred plants. Sowing the seed and transplanting the plants is about the same as for cabbage or tomatoes. The hoeing and general cultivation does not differ from other plants, and when the buttons begin to show for blossoms they should be pinched out, which is called topping. This causes the leaves to spread and the fiber to get thicker and more valuable. Small suckers will form at the top of every stem, where the leaf branches from the main stalk, and must be broken off by a twist with the thumb and forefinger. When the leaves show spots the tobacco should be cut and hung up in the barn or shed to cure.

In cutting, the stalks should be split down to within about six inches of the ground and cut at the roots. Ten or more stalks may then be crossed over a stick four feet long and hung up between poles so the leaves will hang down. I have grown specimens by irrigation, having leaves thirty-six inches long and twenty inches wide. The stem will not cure until Christmas when it may be handled on damp rainy days. Any soil that will produce good cabbage may be planted to tobacco with success, but usually the most satisfactory crops are grown on new land. As a choice house plant for winter there is nothing so beautiful or beneficial as a blooming tobacco stalk, in a pot or box. The plant is very tender and will not stand much frost. Worms attack it when very small and continue eating until after the plant is cut and sheltered in the house or barn.

FALL IRRIGATION.

The benefits of fall irrigation are apparent to every farmer and orchardist who has given the experiment a fair test and watched results. Some think that when trees shed their foliage and fruits are harvested, they should go into winter without

water being applied to the roots. But, this idea certainly is erroneous, and contrary to the laws governing tree life and the natural yearly conditions of forest growth. The native forests are more thrifty, earlier in foliage and produce better fruits after a wet fall and cold winter. Fall rains give the roots an opportunity for storing nourishment and prevent dry rot during the season of rest. The same is true of irrigation, if applied before severe freezing of the ground. Small rootlets do not cease growing throughout the winter, and are the first to impart vigor to the trunks in early spring, hence require moisture.

After a cultivated crop has been harvested a thorough irrigation fills up the soil channels of moisture, assists in rotting weeds and stubbles, and thereby adds to the fertility held in check for the following spring. When irrigated, the coating of weeds and grasses fall more closely to the surface and decay, thus forming a mulch for winter, and fitting the ground for early spring plowing. In most sections of the west the fields are thrown open after harvest for common pasture, and everything in the shape of vegetation is tramped under foot and destroyed, if the fields are left without water from the cropping season. Why then should this important work be neglected and its benefits lost to the farmer? Fall irrigation when coupled with fall plowing will add immensely to the products of tree and vine and the cultivated crops of the next year and should be more generally practiced.

PLANTING CHESTNUTS.

Many western farmers have tried transplanting eastern grown chestnut trees, with but little success, and have naturally concluded that the soil and climate are not suited to nut culture. I have seen many nice, thrifty trees and plucked large, nutritious nuts from chestnut groves in different sections of the West, and am convinced that conditions are favorable for successful and profitable growing of the American varieties in most of the sheltered valleys of the Rocky Mountain and Pacific Coast states. The trees are hard to transplant with success even when taken from the original seed bed, and set immediately,

and of course are more difficult when shipped a long distance. Planting the nuts is therefore more practicable, especially to the amateur farmer.

Seed may be obtained from eastern growers at very reasonable rates and in most sections can be planted in the fall or spring. Men who understand the germinating of chestnuts pack the seed in wet moss or chaff, so that the moisture will be about the same as natural soil in a rainy district. They should be shipped before freezing, and may be planted in the fall if the seed beds are sheltered. The new man at seed planting will do well, however, to plant some in the fall and retain some in a dry, warm place, until spring to plant

or several in a bunch. A lone tree will not be fruitful except in most extraordinary cases, as several are necessary for pollination. If two year old trees are set in a cluster and cared for as fruit trees they will come into bearing in seven years and pay large profits.

JOEL SHOMAKER.

A HINT FOR FARMERS.

The illustration below represents a convenient barn from which farmers who contemplate building may gain a few hints. The barn was built about seven years ago by a Kane County farmer named Ford, now deceased, and occasioned a great deal of wonder and admiration at the time



again. If the soil is well plowed and pulverized to a good depth the nuts may be planted in hills where trees are to stand, otherwise planting in nursery rows till two or three years old is advisable.

A good plan is to plant chestnut seed in drills leaving the rows six or eight feet apart, and after the young trees show along the row, transplant the middle in some thrifty shade trees. This is done to protect the young chestnuts and cause them to grow straight as in the native forest. The nuts may be planted a foot apart, two in a place, about two inches deep, covered with the top soil of vegetable mold and well firmed with the foot. A mulch of leaves, straw or grass is necessary to retain moisture and keep from freezing. Trees should be taken up carefully and transplanted when young, in grove

among the neighboring farmers. As may be seen from the picture, the barn is circular in shape with a silo running from top to bottom directly in the center of the building, the top forming the cupola. The ensilage is put in from above.

The barn will accommodate 150 head of cattle and 20 horses, the stalls for them being on the first floor or half-basement. Water pipes enter the building and supply the stock with water. The door into which the horse and carriage appear to be going in the cut, may be called the main floor. Here the hay, grain and vehicles are kept; the hay and feed being let down to the stock below. The ensilage, too is taken out from below. The barn is very conveniently arranged and a similar one might be built on a smaller scale. An idea of its size may be gained when we say tha

at its dedication—if we may use the term in reference to a barn—in other words, on its completion and before any of the stock or grain was in it, the writer attended a dance given to celebrate its erection, at which 70 couples were on the floor at once, participating in a quadrille, with room to spare. In round dances the couples waltzed around the silo, making quite a trip before they regained the starting point.

L. W.

FRUIT GROWING IN TEXAS.

As an illustration of what may be accomplished in fruit growing by the aid of irrigation we quote the following from the *Laredo Times* regarding the farm of Mr. Thomas C. Nye:

“After enduring a day of insufferable heat in the city, an invitation to spend a night in the suburbs was extended to one of the *Times*’ representatives, by Thomas C. Nye. A ride of four miles over a dusty road, was fully compensated, for on reaching the farm, which is situated on the bank of the river, a wash and an easy chair on the broad verandah, was sufficient preparation for an evening’s enjoyment, and the invigorating southeast breeze served to add zest to an already keen appetite, and the viands on the bountifully supplied table, presided over by the genial hostess, were fully enjoyed. The farm of ninety acres was purchased by Mr. Nye in January last, and it is fully equipped for irrigating purposes, having over two miles of main and lateral ditches, the water being furnished by 10-inch suction and 8-inch discharge pipes. There are two 60 horse power boilers, one of which is kept in constant use, the other being held in reserve; there is a lift of 65 feet and the flow is 700 gallons per minute. There are at present 40 acres in cultivation; it takes 100,000 gallons to the acre for grape culture, and 13 days per month the year round are given to irrigation. The shipment of grapes this year amounted to 2,500 crates, or 50,000 pounds. These were distributed in Chicago, St. Louis, Omaha, Kansas City, Denver, New Orleans and cities of Texas, the latter being the best paying market. The California prune and plum trees apparently thrive well, but thus far have yielded no fruit,

the peach doing fairly well, but the Texas growth does much better. A number of olive trees, which are of slow growth, are now from 4 to 6 years old, but thus far have not borne fruit. The yams planted are doing well, and onions will be planted this fall. Tomatoes will be put in next month. The sorghum crop was a success and is a valuable adjunct to the farm. Apricots thrive, and this year yielded an abundant harvest. The shipping facilities are excellent, the receiving depot being conveniently located within 1,200 feet of the packing house. Mr. Nye is working diligently to make a success of the fruit culture in this section, having tested on his experimental farm in La Salle county the growths best adapted to the fertile soil of the lower Rio Grande.”

The 50,000 pounds of grapes mentioned above were carefully selected and came from 25 acres of Muscats from which some very nice raisins were also made.

MILK RIVER MONTANA NOTES.

The question of early versus late irrigation has been, previous to the present season, an unsettled one. Owing to an unusual rainfall this past spring it was not considered necessary to irrigate as early as usual, as long as it continued “showery;” this worked well, but when the weather became settled, and the sun got warm it was found that the rain had not wet down very deep, and before the land could all be irrigated some serious damage was done to growing crops. It will prove a valuable lesson. While our crops are not as far advanced as they would have been under earlier irrigation, the present indication is assuring.

Considerable attention is being given to fruit in this valley at present, especially to small fruit. The writer picked five quarts of currants from a single three-year-old bush of red Dutch variety and had a number that a gallon was picked from. Strawberries also yield enormously, and in time your correspondent believes apples, crabs, plums, etc., will also do well.

Our farmers are beginning to realize that they have more land than they can do justice to, and a number have expressed themselves as determined to rent a portion of their farms; some have spoken of selling a portion.

PULSE OF THE IRRIGATION INDUSTRY.

THE IRRIGATION PROPAGANDA.

The recent drouth in California has been the means of quickening the interest in irrigation matters and a new impetus has been given by the organization of an association to unite the people of the state for public good. The moving spirit in this organization is George H. Maxwell, editor of the California Advocate, whose interest in irrigation matters is well known. Recently Mr. Maxwell made a tour of Southern California, of over a month in duration, holding meetings and lecturing in the interest of the "Irrigation Propaganda," which advocates the construction of federal reservoirs. Mr. Maxwell, accompanied by his family, began the journey, with his own team, at Palmdale, Cal., holding his first meeting at Myrtle in the Big Rock Creek Irrigation District. Thence he drove around over the desert and the Cajon Pass to San Bernardino. From there he drove to San Diego by one route, and back to San Bernardino by another, concluding the series of meetings at San Bernardino July 23.

During this trip, Mr. Maxwell addressed public meetings almost daily, and for the last two weeks held two meetings nearly every day, having spoken at Escondido, San Marcos, Encinitas, Carlsbad, Ocean-side, Fallbrook, Temecula, Murietta, Elsinore, Riverside, San Jacinto, Hemet, Winchester, Perris, Moreno, Bloomington, Colton, Redlands and San Bernardino.

The announcement of the meeting at Redlands was very brief, merely a card in the afternoon paper, but it drew an audience of about seventy people. On the following day a committee of the citizens of that city wired Mr. Maxwell as follows: "People of Redlands would like to hear you more on water question. Fix date and a big audience will meet you at once." This is certainly good evidence that his treatment of this important subject impressed his hearers as a correct solution

of the difficulties that now confront the state in its efforts at further irrigation development.

The constitution of the association being organized is, in part, as follows:

"The name of this association shall be 'The Irrigation Propaganda'—
Section.'

"Its purpose is to awaken an active interest in and to promote irrigation development and to relieve the conditions of disaster which have arisen in the irrigation district system, and to aid in inaugurating and carrying on an educational campaign to arouse the people to a realization of the far-reaching benefits which would result to all classes of the people from the construction of state and national irrigation works and Federal storage reservoirs."

The sections of the principles of the propaganda relating to a national arid land policy were either taken from the resolutions of the Phoenix and Lincoln Irrigation Congresses or have been endorsed by them. Mr. Maxwell was a delegate from California to the Phoenix Irrigation Congress and he urges that the people of California do all in their power to make the next Irrigation Congress, which is to be held in Cheyenne in September, a great success.

On July 25 Mr. Maxwell lectured at the Chamber of Commerce at San Francisco on the proposed construction of Federal storage reservoirs to supply water to the arid lands of the west. After quoting from the report of Col. Chittenden to the effect that "No one can cope with the problem [of storage reservoirs] except the Federal government," Mr. Maxwell says:

"There is no difference in principle between the government building levees along the Mississippi, to protect the adjacent territory from destruction by flood and building reservoirs to restrain the flood waters for use in irrigation to pro-

tect the territory in the arid states from destruction by drought. In either case it is to preserve the resources of the nation from destruction.

The importance of the proposition to all California and all arid America is beyond calculation or imagination. It is the only way water can be provided for the irrigation of millions of acres at a cost sufficiently low to enable the tiller of the soil to use the water and bear the burden of its cost and prosper, and unless the Federal government will adopt this policy millions of fertile acres must remain a desert for centuries, or forever.

The time is ripe to inaugurate the policy by working to get an appropriation through the next Congress to build the reservoirs already surveyed in Colorado and Wyoming, and also to survey sites for new reservoirs in other states, among others California, and then go on with their construction. There are strong reasons for the belief that the whole project is perfectly feasible and can be accomplished, if the people of California and the whole West will unite and actively agitate the question and work for it. California would have strong support from other western states, but ought to lead the movement because she has most to gain from it.

* * * * *

One proposition especially deserves to be pondered, which is that our present laws of water are a patchwork and an imbecile system of allowing water for irrigation to be the subject of private ownership without any reference to the ownership of the irrigated land. The only sensible system is that of Wyoming and Nebraska, where the right to the use of water for the irrigation of land belongs not to any individual, but to the land reclaimed. Such a man as Elwood Mead, the state engineer of Wyoming, who planned the irrigation laws of Wyoming, which are the model for all states to copy after, could frame laws which would enable us to work out the problem in California of a state

system, but it can only be done by recognizing the fact that water must cease to be a speculative commodity, and go to the land it is designed to irrigate as a perpetual appurtenance forever.

However much we may criticise our present laws we must never forget that vested rights have grown up under them and whatever those rights are they must be recognized and upheld. We cannot upbuild by tearing down. Whatever is must be left as it is, so far as legal rights are concerned, but wherever new water supplies are created by storage a new and sensible system can be adopted to control them in the interest of the producer from the soil, to whose prosperity we must look for the prosperity of the whole people."

The policy of the construction of government irrigation works, to reclaim arid lands has been often agitated, Mr. Maxwell says in conclusion, but that now the time is ripe for it, as there are 2,000,000 men out of work and 100 000,000 acres of land that might be reclaimed for their use by irrigation.

UTAH ENTERPRISE.

As Utah may be looked upon as the birthplace of American irrigation, it is not surprising that her farmers should be the ones to try original methods. The following item from the Salt Lake Tribune may give a useful suggestion to farmers in other portions of the arid district.

"To show what a few men without means can do when they try, a few farmers who have always been short of water in Sevier county to mature their crops, clubbed together last spring and bought out a neighbor's farm for \$2000. Then they went to work and built a dam at an expense of \$300, making the farm which they purchased a reservoir. While the water was high they turned a stream that was running to waste into this reservoir, with the result that when water ran low last month, they opened a canal from this reservoir, and for eighteen days ran their canal from it with a volume sufficient fo

ten usual irrigation streams. That carried their crops to a point where they will need no more water this year, and from their crops the extra return will more than pay for the farm that they bought and the dam that they built. How many places there are in Utah where this same thing could be repeated with similar results?"

THE GILA BEND CASE.

After years of litigation the Gila Bend case is settled. Under date of July 25 a Phoenix (Ariz.) paper says:—"A mandate from the Supreme Court of the United States, in the case of the Gila Bend Reservoir and Irrigation Company against W. H. Linn et al., of Peoria, Ill., was received by the clerk of the Territorial Supreme Court today. The mandate affirms the decision of the Territorial Supreme Court in affirming the judgment of the District Court three years ago in favor of the appellees. No further action can be taken until a remittitur is ordered down next October, when the property will be sold.

The irrigation project was begun eight years ago by Gov. Wolfley, originally designed to cover a million acres along the Gila River below Gila Bend. The project was to reduce 150,000 acres, and \$1,000,000 was expended in construction by the Arizona Construction Company, composed of John B. Greenhut, John R. Francis and other Peoria capitalists.

Litigation ensued and three years ago the property was thrown into the hands of a receiver. All the land under the system had been entered, but the people were discouraged and the entries were forfeited. A removal in that section is expected."

STATE NEWS.

IDAHO.

The rains which came the latter part of July were of inestimable benefit to dry land crops, which have been greatly in need of the moisture, but interfered materially with haying. In the extreme southeastern section the rainfall was com-

paratively light, and the drought has been only partly relieved. Grain is for the most part in excellent condition and promises more than an average crop; in parts of the western section wheat will soon be ready for harvest. The potato crop is doing nicely, and many early potatoes of fine quality are on the market. Garden truck is in a good condition generally. The fruit crop is doing well. Cutting of the first crop of lucern is nearing completion. All hay crops in the northern and western sections are apparently short, but in the eastern they are fully up to the average. The second crop of lucern is growing well.

Lewiston, Idaho is soon to have railroad connection with Spokane, Wash. For the past forty years, Portland was its market, but the building of the 120 miles of railroad between it and Spokane will take a great deal of the trade to the latter city. Lewiston is a city of 3000 inhabitants and is a thrifty progressive place, which will soon add a street railway and a suspension bridge to its other improvements. E. H. Libby, a prominent business man of Lewiston and connected with the Lewiston Water and Power Company is very enthusiastic about the advantages of Lewiston Valley in the Snake river vicinity. The timber, he claims, is unsurpassed by Michigan, the reports of experts show abundant deposits of gold, copper, and silver in the vicinity of Lewiston, while the fruit and wheat growing capacity of the surrounding country is acknowledged by all who are acquainted with that section.

UTAH.

The early part of July was extremely hot in Utah, the thermometer at Beaver recording a temperature of 104 degrees, the highest ever known in that section since 1856. While at Milford it reached 108 degrees.

"While several attempts have been made in Emery county within the past two years to foster the silk industry, Mr.

Chris Anderson of Huntington, seems to have accomplished more in this direction than anyone else. He has a large number of worms which began spinning in July, and Mr. Anderson feels that his efforts will be crowned with success. He now finds it necessary to send teams to neighboring towns to gather mulberry leaves, he not having a sufficient supply to sustain his worms. Mr. Anderson is a blind man, and it is hoped the result will prove as successful as he anticipates."

"From Elsinore, Sevier county, this year there has been shipped 750,000 pounds of wool, which brought on an average $12\frac{1}{2}$ cents per pound.

The clip averaged $6\frac{1}{2}$ pounds per sheep. This wool was not all a product of Sevier county. Some came from Garfield. There was also shipped from the little station of Vara some 250,000 pounds. The result is that the sheepmen in that region are capitalists, and there is more money in circulation than there has been in a long time before. One result is that this year the people have set out 18,000 fruit trees, and expect in three years more to not only have all the fruit that they need, but some to sell. And tree-planting has only commenced there."—Salt Lake Semi-Weekly Tribune.

Utah has the promise of a bounteous harvest this year. The farmers have never done better, the mines are yielding superbly, for though the great silver mines are idle, the mixed mines of silver and lead are running full force while in the gold mines there is a yield of 50 per cent over any former yield. Truly an encouraging forecast.

CALIFORNIA.

Thomas Larkin who was the first white child of American parents born in California, died July 24, aged 63 years.

Green fruit shipments from California this year, notwithstanding the shortage of the fruit crop will exceed those of last year by 175 car loads. The freight traffic manager of the Southern Pacific company es-

timates that about 4,000 carloads will be shipped east this year. There has been a shortage in pears, peaches and apricots, but an increase in prunes and raisins.

TROUBLE IN IDAHO.

"Look not upon the wine when it is red," saith the temperance advocate, but an appropriate text for Idaho farmers would be "Meddle not with thy neighbor's dam." Two Idaho farmers have recently given an example of how much "envy, malice and all uncharitableness" may result from water. The above, mentioned farmers, Cash and Johnson, residing near Idaho Falls, both used the same ditch for irrigating purposes, and the latter placed a dam in the ditch. Cash claimed that Johnson was thus getting more than his share of the water and so partially opened the dam in order to obtain water for his stock. Johnson objected to this and insisted that he at once tighten up the dam, threatening to shoot if he did not do so. Cash refused, and Johnson fired, the shot shattering the former's knee-cap so that his limb will probably have to be amputated. Then Johnson started to town to give himself up, but on the way accidentally discharged his gun and shot off one of his toes. Behold how great a matter a little water causeth.

TO SET THE COLOR IN GINGHAM.

To set the color in gingham, the gingham dress may be dipped in a bucket of cold soft water before washing. Madras may be treated in the same manner, which frequently will set the color. A better way, however, is to try a piece of the dress by dipping it first into salt water, then washing it, next time dipping it into an acid water before washing. In whichever way the color seems best preserved the whole garment may be washed.—August *Ladies' Home Journal*.

The Rochester Democrat and Chronicle think the name of the German warship at Subig bay should be changed from "Irene" to "I-ran."

WITH OUR EXCHANGES.

The editors of Scribner's, McClure's, Ladies Home Journal, etc., with due regard for the taste of their readers and knowing full well how hard it is to do any "solid" reading during "dog-days," have catered to the popular demand and made their August numbers, "fiction numbers."

SCRIBNER'S

The cover of the mid-summer number rivals in beauty even that of April, the spring number. The red and gold coloring and the little child reclining upon the lap of the mother crowned with poppies, gives the effect of summer, warmth and langour. The poem of Edward Sanford Martin, entitled the "Sea is His," is made doubly attractive by the beauty of its colored illustrations. "The Rocking chair Period of the War," the first article, contributed by Richard Harding Davis,—gives an account of the long wait of the troops at Tampa previous to their embarkation for Cuba. The Tampa Bay Hotel, where officers and war correspondents made their headquarters was so out of proportion in point of size to the visitors that might reasonably have been expected, that one of the cavalry generals said "Only God knows why Plant built an hotel here; but thank God he did." Mr. Davis says, in speaking of the rations the soldiers received while at Tampa, "It seemed a fact almost too good to be true, that the great complaint of the New York men was the super-abundance of beans served out to them, and that the first complaint of the sons of Massachusetts was that they had not received beans enough. 'Beans for breakfast, beans for lunch, beans for dinner—what t' hell!' growled the New Yorkers. 'And as for beans,' shrieked a Massachusetts warrior, 'they don't give you enough to fill a tablespoon!'"

Among the short stories the two that are rivals in point of entertainment to the reader, though entirely dissimilar are "The Amalgamated Bill," by Charles Warren, and "A Saga of the Seas," by Kennette

Grahame. The former hinges upon an attempt to prevent the governor's vetoing a certain bill, and in some respects has such a similarity to a much-talked of bill and a governor not a thousand miles from this city, that one wonders if the resemblance is wholly accidental on the writer's part. The latter story tells of the wonderful sights seen by the little hero in his great voyage to foreign countries. To be sure the vessel in which he sailed was a small bath tub placed on towel-horse, and the ambitious traveller did not go beyond the walls of his nursery, but he had a most wonderful voyage, nevertheless, and saw marvelous things.

MCCLURE'S

A pen picture of boyhood that carried even the oldest reader back to the days of surprise parties, "kissin' games" and autograph albums, is the story by William Allen White entitled "While the Evil Days Come Not," A Boyville Story. The note to his "Heart's Desire" confiscated by a heartless teacher and read before the school, the tictac, the card with the legend "If I may not C U home may I not sit on the fence and C U go by?" Are all life-like touches that bring before us the "King of Boyville", as a living person.

The first story is called "In Ambush" and to say that Rudyard Kipling is the author is sufficient to commend it to the reader's attention. "Love in a Fog," by Hester Caldwell Oakley, is an original and delightful little tale. The "Charles A. Dana's Reminiscences" contain a fac simile of the order sent by C. A. Dana to General Miles in 1865, to place fetters on the hands and feet of Jefferson Davis, then prisoner of war in charge of General Miles. A portrait of the latter as he looked in war times is also given.

THE LADIES HOME JOURNAL

contains in addition to its various departments, nine stories, and certainly earns its title of the "story number." Among them

is one by the well known writer, John Kendrick Bangs, "The Adventures of an Organ" told in his happy, humorous vein. "The Man in the Corn House," by Sewell Ford, is founded upon incidents of the war of 1812. "The Sixteenth Man" is a love story whose rather stale plot is redeemed by the originality of its style. "Summer Piazza Stories" are little incidents concerning prominent men and women that make up the most entertaining page in the magazine.

REVIEW OF REVIEWS.

If the foregoing are called fiction numbers, the Review of Reviews may well be classed as a "war number," since it is mainly concerned with the war and its results. "Spanish Traits in the New World" is one of the fairest and most unbiased views that we have seen taken of the Spanish character. Sylvester Baxter points out, in it, the Spaniard's good traits—something we have heard so little about that we almost doubted their existence. "Present Problems and Politics of France," is discussed very ably by Baron Pierre de Coubertin, and there are many other articles of timely interest, such as "Our Battle with Cervera's Fleet," "The Siege and Capture of Santiago," and of course, the ever-present problem "What Shall be Done With the Phillipines?" receives a share of attention.

REVIEW OF REVIEWS FOR AUSTRALASIA.

We have just received the June number of this publication. In it we find the first portion of an article by W. T. Stead en-

titled "Character Sketch; Uncle Sam, Lord Chief Justice of America." In it he discusses the war with Spain from an American standpoint, making a very interesting matter of it. A great many of the clever war cartoons are reproduced in it. The same writer under the heading "Topic of the month" discusses the Anglo-American Alliance.

THE FORUM.

The conclusion of the article by Albert von Schaffle, "Austria-Hungary Under the Reign of Francis Joseph" appears in the August number. Brooks Adams discusses "The Spanish War and the Equilibrium of the World." Major John U. Powell, director of the Bureau of American Ethnology tells "How a Savage Tribe is Governed." Savage society consists of four divisions--the family, the clan, the tribe and the confederacy--and in opposition to civilization, savages regard the mother as the owner of the children and they therefore belong to her clan.

It has been many years since the phenomena of spiritualism has occasioned enough interest to cause standard journals to print anything regarding it, but in this number of the Forum James H. Hyslop writes concerning the work of the Society for Psychical Research, which was founded in 1882 for the purpose of investigating table-turning, slate-writing and other spiritualistic mysteries. The title of the article is "The Problems of Immortality" and will commend itself to those interested in psychological problems.

ODDS AND ENDS.

MARY STUART'S CURIOUS WATCHES.

Among the watches owned by Mary Stuart was a coffin-shaped watch in a case of crystal. Probably the most remarkable one in her collection was the one which was bequeathed to Mary Seaton, her maid of honor. It was in the form of a skull. On the forehead of the skull was the symbol of death, the scythe and the hour-glass. At the back of the skull was Time, and at the top of the head was the Garden of Eden and the Crucifixion. The watch was opened by reversing the skull. Inside was a representation of the Holy Family surrounded by angels, while the shepherds and their flocks were worshipping the new-born Christ. The works formed the brains, while the dial plate was the palate. She also possessed another skull-shaped watch, but it is not known what became of it.—August *Ladies' Home Journal*.

DIGGING POTATOES.

A man can dig potatoes by hand. He can also cut his hay with a scythe, harvest his grain with a cradle, and thresh it with a flail. He does not do any of these things however. Why? Because hand labor is too expensive and too exhaustive. Further than this, he knows from experience that the labor can be performed in a better way by machinery. These things are no less true of digging or harvesting potatoes. There is little work on the farm that calls for more arduous backaching labor than digging potatoes. Many men have been deterred from producing this valuable and money making crop solely from the diffi-

culty of harvesting it. If you have been digging your potatoes by hand in the past, quit it this fall and buy a machine for the purpose. With a machine you can dig your own potatoes and those of the entire neighborhood, thus saving your neighbors much labor and making a snug sum for yourself.

The Hoover digger made by Hoover, Prout & Co. of Avery, Ohio, is a very superior machine. Write them for catalogue. The price has again been reduced.

HE WANTS TO KNOW.

AN AGE subscriber writes us that he intends going into irrigation and desires a few hints from those of the more advanced disciples of the art. He says he is satisfied, that in order to insure good crops in Texas where he is located, irrigation is a necessity. He therefore intends trying it and with this end in view would like to have a few practical irrigators give him, through the columns of this journal, "some minute details as to the manner of conducting water from a main reservoir to different parts of the land to be watered, also the probable cost per foot of the same." He wishes to know the proper method for irrigating onions, Irish potatoes, sweet potatoes and turnips. Our columns are open for answers to these questions and we hope that those versed in these matters will hasten to reply.

Corn and oats are splendid;
Grand crop of wheat;
Summer crop of islands
Can't be beat.

—Chicago Record.

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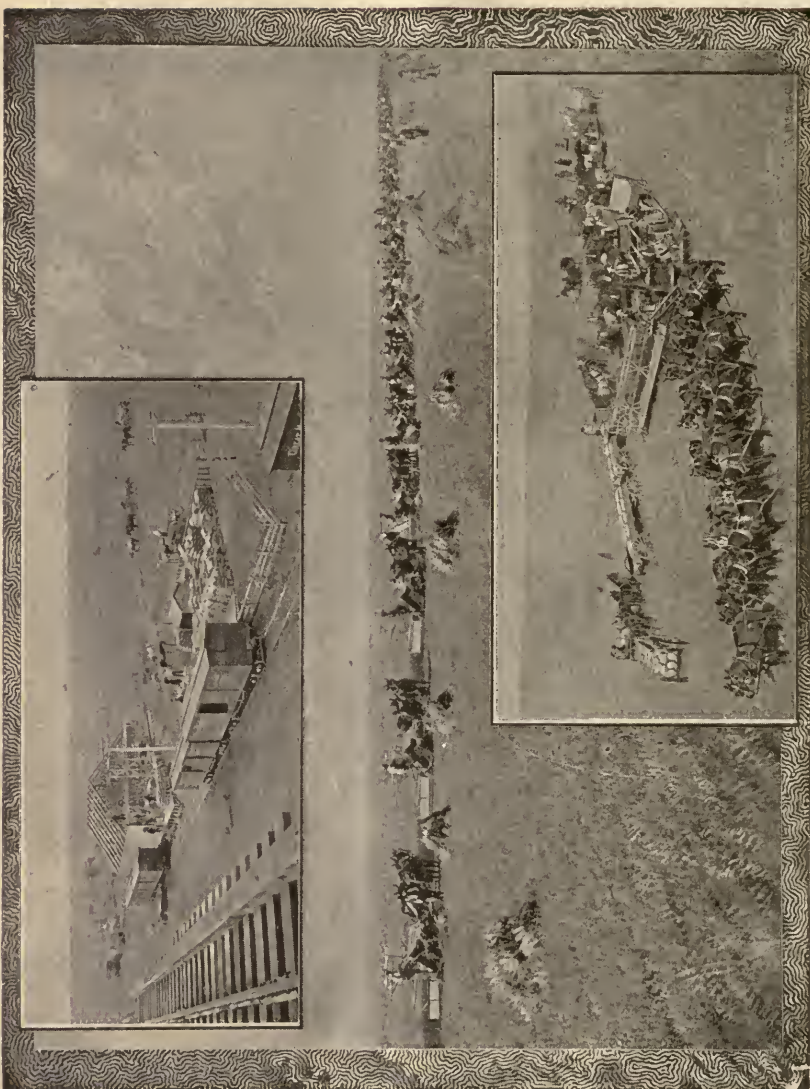
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HARVESTING GRAIN IN DAKOTA.

THE IRRIGATION AGE.

VOL. XII. CHICAGO, SEPTEMBER, 1898. NO. 12.

THE PROGRESS OF WESTERN AMERICA.

The End of Vol XII. This, the September number, completes volume XII of the IRRIGATION AGE and marks the close of the first year under the present management. We have "got our hand in" and intend making volume XIII testify to the fact by being better than its predecessors. Irrigation is one of the *vital questions* of the hour, and never was there more need of a journal devoted to its interests. We want to make the AGE a practical journal, and we need your help to do it; we want pictures of your fine cattle, your homesteads, your choice fruits: we want hints as to the best methods of farming, gardening, fruit raising; if you have discovered any new device to assist in your work, anything that tends to make life more "worth living," let us hear about it; write and tell us about your home-made irrigating devices. The man with plenty of money can go to a competent irrigation engineer and hire him to put in an irrigating plant. But we want to help the small farmer—the one who has to make a dollar go the farthest—to help himself, by giving him an insight into new and improved methods.

Among the contributors to Vol. XII have been such well known men as Geo. Maxwell, T. S. Van Dyke, Joel Shomaker, Dr. Clarke Gapin, and others who are posted in the mysteries of irrigation and the coming numbers of the AGE will be but a continuation of "good things." Don't be afraid to subscribe for fear the journal is dead, for fear it will not come out regularly; the AGE is on a firmer basis than ever and will come out every month

promptly on time, as it has done every month since last October. Subscription price \$1.00 per year; single copies 10c.

The Dove Returns. By virtue of the protocol, signed August 12, President McKinley ordered a suspension of hostilities. It was 114 days from the formal declaration of war until the issuance of the above order, which practically marks the close of the war, for though the protocol is but the preliminary document, there is no doubt but what Spain will gladly sign the treaty of peace which is to be prepared not later than October 1, by the commissioners who are to meet at Paris. Knowing Spain's proclivity for postponement it was thought best to fix a hard and fast date to avoid any delay in the peace negotiations. At the beginning of hostilities this country demanded that Spain abandon Cuba. This demand was refused, and now by the articles of the protocol, agreed to by M. Cambon, the French ambassador at Washington, acting for Spain, and Mr. W. R. Day, Secretary of State, acting for the United States, Spain is required to give up Cuba, Porto Rico, and all her other possessions in the West Indies, one of the islands of the Ladrone group, the city, harbor, and bay of Manila and to evacuate them at once and to submit to such other actions as may be decreed by a joint commission.

What to do with the volunteer regiments, is the next question. There is some protest against retaining the volunteers for garrison duty in Cuba and Porto Rico, now that the war is over, some claiming that the government has no right

to exact this of the volunteers! The *Minneapolis Tribune*, in its editorial comment on this subject, suggests that, as there are plenty of volunteers who are willing to do garrison duty, a vote might be taken by the regiment and if the majority of the officers and men of a certain regiment desired to remain, the regiment could be retained for garrison duty, recruits being sent to fill the places of those who desired to be mustered out. In this way the matter could be settled to the satisfaction of all concerned.

The Return- ing Heroes. No great campaign was ever carried on, no reform was ever inaugurated but what the chronic grumbler had "some kick coming," to borrow a phrase that is expressive if not elegant, upon the way the affair was managed. But the universality of the "kick" against Alger, the unanimous agreement between rival newspapers on this subject, indicates that there must be some foundation for the charges of incompetency made against him, for it is a true saying that "where there is smoke there must be some fire." When our soldiers landed at Montauk Point, after enduring the ravages of disease, the hardships of the field, the perils of battle, and the privations entailed on the homeward trip, upheld by the blessed certainty of finally reaching "God's country" where such suffering would be unknown—when, after enduring all this with patience and unequalled fortitude, they reached the Mecca of their hopes and found inadequate surgical aid, no shelter for many, and lack of the necessities of life—they must have been forced to draw comparisons between their condition and that of the Spanish prisoners who were faring sumptuously at Annapolis, and possibly a doubt as to Alger's fitness for the responsible position he holds crept into their minds, as appeals to Washington for help met with no response. A veteran of the civil war, who saw the first battalion of the 71st New York regiment land at Montauk Point said, "I've seen some pretty tough looking regiments, but I never saw 'em look like that; not just like that—not with them faces and them eyes. Why, I tell you, half of 'em ought to be on litters." But instead of being on litters

many of them spent the night in the rain while the surgeons and attendants fairly wrung their hands at their powerlessness to do for all of those who came.

The fleets that did such good service, were welcomed at New York with an innovation that was as enthusiastic as it was deserved, but if reports are true,—and even the best that we hear is bad enough—the failure to provide adequately for the needs of the soldiers at Montauk Point is a disgrace to the man who should have seen to this matter and we feel ashamed to think that the hardships endured by these noble men were but little less in this civilized land than they were in the deadly wilderness of Cuba.

To the administration in general belongs the heartiest praise for the manner in which the war has been carried out, but Alger seems to be the "round peg in the square hole."

Some Interesting Statistics. A. P. Austin, chief of the Bureau of Statistics, Treasury Department, Washington, has kindly sent a statement regarding the commerce of the fiscal year, from which it is learned that the western parts of the country are decidedly on the gain from a commercial standpoint. The rivalry between the coast cities for the honor and profit of handling a satisfactory proportion of the foreign commerce has been unusually sharp in the past year or two. The rapid growth of the carrying trade along the chain of great lakes and thence by canal or rail to the coast, the sharp competition and reduced rates by rail from the great grain fields of the West to the South Atlantic ports and the increased rail and water facilities of transportation between the upper Mississippi valley and the Gulf ports, together with improved harbor facilities at various points, have produced material changes in the drift of the great bulk of the grain and provision product of the country which goes to Europe; while our increased commerce with Asia and Oceanica has materially and advantageously affected the business of the ports on the Pacific coast. These facts, together with the claims that certain ports enjoy special advantages in railway rates and terminal facilities have made the interest

in the comparative business of the ports unusually great.

A comparison of the figures covering the exports and imports of the various ports during the fiscal year with those of preceding years presents some interesting and suggestive facts bearing on this subject. They show that the Atlantic ports considered as entire group retained, when compared with the preceding year, their normal proportion of the exports of the year, but lost slightly in imports. The Gulf ports did not as a whole maintain the rate of increase which the country at large made in exports. The Pacific ports made the most satisfactory record of any group, their gain in exports being 25.7 per cent, while they actually gained in imports 16.3 per cent, while the total imports for the country were being decreased 19.3 per cent. The northern border ports made the largest percentage of gain in exportations, their total for the year being 27.3 per cent greater than that of the preceding year, while in importations they lost 21.1 per cent.

Taking up the leading articles of our exports, such as wheat, corn, flour, etc., it is found that the North Atlantic ports have lost materially in their proportion of the export trade, while their loss becomes the gain of ports farther south.

Those Dreadful Masons. A statement which might cause anger if it were not so ridiculous as to be mirth-provoking, is the one made by the *Catholic Review*, claiming that Freemasonry was the cause of the Spanish-American war. According to this organ the war was due to the conspiracy of the Masons in Spain and the West Indies with those of America to destroy Spain because it was a Catholic country. The Franco-Prussian war, of 1870, so the *Review* claims, was due to the influence of the Masonic Fraternity. A Mexican paper the *Tiempo*, also blames the Masons for the war, and goes further, claiming that the surrender of Santiago and the general reverses that have befallen the Spanish army, are due to this association. The *Literary Digest* quotes from *Tiempo*

regarding this as follows:—"One explanation, and only one, is admissible, and that is that the surrender was the result of a Masonic agreement. The Sagasta cabinet, from the premier to the lowest officials, are all Masons. They are all, all Masons, and the government is completely undermined by this accursed society, and the interests of the country, as is universally the case where Freemasonry predominates, are secondary to those of this satanic organization."

It is human nature to fear and dislike that which we do not understand. And those to whom the principles of Freemasonry are a sealed book, think that the fact of it being a "secret" organization is proof that it is bad. Others equally ignorant of it, take a different view. A woman once said, in speaking of this subject, "No, it is true I do not *know* any of the inner mysteries of the order, but the fact that a good man like my father is a member of it, convinces me there can be nothing bad in Masonry." Those of us who are acquainted with the honorable men comprising the Masonic lodge, can heartily echo this woman's sentiments.

A Quotation.

"I look to irrigation to once more place the life of the farmer on its former basis of comparative ease and comfort. It is now only too largely a life of illy-recompensed drudgery. The prices he now receives for his products are only one-half, and in some instances only one-third what he once received. If he must go on tilling the same amount of soil to raise the same crop he is only one-half or one-third as well off as he once was. But if he can till one-third the acreage and yet produce the same product he is not only back to his old plane as a wealth producer, but has made a gain. This irrigation will do for him. But alas! how slow the farmer is to see these things and make practical use of them. In the mechanical line a man who would offer a machine which would increase the output of a factory three-fold could not fill orders."—DR. CLARKE GAPEN.

IRRIGATION IN MONTANA.

BY JOEL SHOMAKER.

Montana is the third largest state in the Union, covering an area 550 miles in width from east to west, and 300 miles in length from north to south. The boundaries include 146,080 square miles, or 92,998,400 acres, equal to the six New England states and New York thrown in for good measure. The lands are divided among the different industries about as follows: Farm lands, 30,000,000 acres; grazing lands or natural pastures, 38,000,000 acres and native forests, 14,000,000 acres. One-fifth the area is more or less mountainous, hence the name from the Indian jargon, meaning "Country of the Mountains". The principal cultivated valleys and land capable of irrigation and cultivation, lie below the 4,000 feet altitude mark, and are suited to all classes of gardening, fruit growing and farming.

Montana was made a territory May 26, 1864, and admitted as a state, Feb. 22, 1889. The population in 1880 was but 39,000, while in 1890 it had increased to 132,159, of whom 1,490 were returned as colored. Present estimates place the inhabitants above 250,000, and the rate of increase from immigration is getting larger every year. The state contains sixteen large county divisions, and over fifty cities and towns, ranging from 500 to 50,000 in population. According to the last census reports, there were in 1890, a little over four per cent of the people engaged in cultivating 5,603 farms, averaging 95 acres. The number of farms has increased wonderfully since then, and the small farm acreage has reduced the average. The first cost of water rights has averaged \$4.63 an acre, and the maintenance fee 95 cents per acre annually. Water for irrigation purposes is plentiful almost everywhere throughout the state, and many small farm ditches are in use.

Irrigation began with the early settlers and has increased as the demands for agricultural products have been increased. The first ditches were individual farm canals of various dimensions, made to carry small volumes of water, usually a few hundred yards, to the fields. In some sections but little irrigation is required and one application of water frequently matures a general crop. The rainfall averages about fifteen inches a year and much of this comes in April, May and June, giving crops a good start and even allowing time for some to mature before the dry season begins. Wheat, rye, oats, barley and potatoes are usually grown with one irrigation, though in some seasons the potatoes and oats may be irrigated twice, and in rainy years the irrigation is dispensed with entirely. The flooding system is in vogue throughout the state, though the furrows are used in gardens and cultivated fields.

The sources of water supply are everywhere present in such rivers as the Yellowstone, Missouri, Milk, Sun, Powder, Big Horn and others, with numerous creeks and mountain lakes, and many artesian wells tapping the underflow basins. Present estimates place the area under irrigation at over one half million acres, and the number of farmers at 7,000 or more. The old methods of appropriation and general lack of measuring apparatus has caused considerable trouble in adjusting claims for water, but modern ideas are being adopted, less water is used and the waste prevented, thereby leaving more in the natural waterways for new claimants. Although the mountains are low, the highest peaks only reaching about 11,000 feet, there is practically no limit to the water supply, but winter storage reservoirs would insure perpetual and never failing ditches and many times the present population could be supported on the broad tillable areas.

Montana has a dry, bracing atmosphere, in all valleys except the northwest, where the warm, moisture-laden Chinook winds from the Pacific Japanese current furnish enough to temper the breeze and dispense with irrigation. Some sections thus affected may be termed sub-humid and differ materially from the irrigated mesas. The western portion of the state, in the vicinity of Butte, Helena and Anaconda is more thickly populated and farms are smaller because of the local demands for product occasioned by the mining industry. This is no small inducement for increasing mixed farming, as during the past quarter of a century not less than \$500,000,000 in precious metal have been taken from the placer and quartz mines of the state. Those not familiar with actual local conditions suppose Montana is too cold for agricultural success, but the idea is erroneous in every particular. In severe winters the thermometer reaches 25 degrees below zero in unprotected places, but this is not so noticeable as zero in the humid districts of the east.

In 1897 the farmers of Montana had 69,792 acres planted to wheat and harvested 2,268,240 bushels, of which one-quarter million bushels found an outside market at good prices. The oat crop for last year required 61,000 acres and produced nearly three million bushels, over one-quarter million bushels being shipped to the world's markets. Other crops yield proportionately and the alfalfa and wild hay reaches 500,000 tons a year, which is fed to cattle and sheep in fattening for the early spring markets of Chicago and Omaha. The products can be quickly shipped to any market in the world, through the perfect railway system, reaching every important agricultural district. The Oregon Short Line, Northern Pacific, Montana Central and branches extend over 2,735 miles of surface and ramify the many districts, giving direct shipping routes to the Pacific coast, the Canadian Northwest and the inland commercial marts of the United States.

The several irrigated valleys of Montana are admirably adapted to fruit growing and market gardening and the local market consumes

everything in the fruit and vegetable line, in addition to making importations from Utah and Idaho. The sunny slopes of the Yellowstone, Bitter Root, Missouri, Gallatin and Milk river basins produce most wonderful vegetables of all classes. Gardeners grow potatoes weighing three or four pounds, rutabagas tipping the scales at ten pounds and turnips as large as wash basins. The soil being a decomposed mold of vegetable fertilizers and the climate exceedingly mild makes of these valleys a perfect land for producing melons, tomatoes, sweet potatoes, tobacco, peanuts with all the small fruits suited to such climate. There is no better state for the successful culture of strawberries, raspberries, blackberries and similar fruits. With perfect irrigation facilities, unequaled home markets and the natural assistants—climate and soil, the irrigable valleys of Montana will become perpetual homes of peace and plenty.

Private ownership of irrigating ditches and the necessity for using the inventive powers of the pioneers have caused the farmers to utilize their home water power for many labor saving devices. It is no unusual thing in this state to find a man with a small wheel in his ditch creating power for running a churn, feed cutter, corn grinder, wood saw, grindstone or other farm utensil. In some instances the ditches are used in filling fish ponds or ice reservoirs. Several residents are engaged in fish culture, using fresh water ponds or reservoirs for growing the best market species. The census of 1890 gave 43 persons engaged in inland fisheries within the state, but the business has greatly increased in the past eight years. A system of summer fallowing one half the land has been practiced since the settlement of the state, especially by those having individual ditches. This method of alternating the land it is claimed increases the yield and maintains natural fertility without expense.

Stockraising has been the chief range industry for a quarter of a century and will continue for many years, independent of agriculture, but a change is gradually taking place, and sheep and cattle are becoming a part of the small farm properties. About 3,000,000 sheep are owned by farmers and wool growers, and many are fed alfalfa and farm crops through the winters, increasing the wool and mutton qualities and resulting in the addition of much more annual wealth through irrigation and cultivation of feed crops. The cattle herded and fed number over one million head, while a quarter-million of horses add to the grazers occupying the strictly range land. In former days stock of all kinds ranged over the native fields summer and winter, but the increase in agriculture has made feeding profitable. This has a tendency to reduce the area of individual farm holdings and increase the number of small farmers. The result has been a steady and permanent growth of small farm yields and values and the making of a great agricultural state.

A general increase in irrigation interests marks the present year

and many new enterprises are under headway, to carry out the provisions of the Carey act. The state has a canal near Big Timber, under construction which is to irrigate 25,000 acres on the Yellowstone benches. Another scheme is to divert the waters of the Big Horn and irrigate the Crow Indian reservation. When the plans are completed the Indians will have ten canals and every individual own 50 acres of irrigated land. Numerous projects large and small are under way on either bank of the Yellowstone and many thousand acres will soon be reclaimed by new canals. The state contemplates putting the entire million acres, provided for by the Carey act, under irrigation at an average cost to water users of \$8.00 or less per acre, with a rental of about one dollar a year.

CHARITY.

Came two young children to their mother's shelf

(One was quite little and the other big),

And each in freedom calmly helped himself.

(One was a pig)

The food was free and plenty for them both,

But one was rather dull and very small;

So the big smarter brother, nothing loath,

He took it all.

At which the little fellow raised a yell

Which tired the other's more aesthetic ears;

He gave him here a crust, and there a shell

To stop his tears.

He gave with pride, in manner calm and bland,

Finding the other's hunger a delight;

He gave with piety—his full left hand

Hid from the right

He gave and gave—O blessed Charity!

How sweet and beautiful a thing it is!

How fine to see that big boy giving free

What is not his!

—Mrs. Stetson's Poems.

UNPROFITABLE IRRIGATION WORKS.

NO. IV.

BY T. S. VAN DYKE

In every case in which I have been interested in building irrigation works the question has been raised by capital, "Can the supervisors or any other body interfere with the annual rates or rentals?" It has been necessary in every case to satisfy capital that these could be fixed beyond the power of any body to disturb. And this is probably so in the great majority of cases, as sooner or later capital understands its business. Few people of any sense would build works for irrigation if the rates can be thus changed by the supervisors. It is entirely different from the fixing of city rates, where there is but trifling danger of their being fixed too low and where there are no such contingencies as there are in irrigation works.

In most all cases it has been easy to satisfy capital upon this point, and where you can make a sale of water at all it is easy to have the rate fixed perpetually by contract. The man who is wise enough to aid the building of works by buying water is also wise enough to see that it is as much for his interest as it is for that of the company to have the rates fixed forever. If they are too high they are a serious bar upon the sale of the land in case he wants to sell, and if too low he knows that means running down of the works, bad service and consequent depreciation of his land values, to say nothing of the annoyance and loss if he works the land himself. He knows, too, that supervisors can be influenced by companies as well as by land owners, and that those who howl most lustily about the interests of the dear people are often the first to forget them when they gain a position where they could benefit them.

Within the last year an eminent federal judge in California, whose opinions command profound respect, decided that a contract for furnishing water for irrigation out of appropriated water at a certain rate per annum was illegal, because the sale of appropriated water was a public use and as such subject to the annual rates as fixed by the supervisors of each county. I understand that the Supreme Court of Idaho has lately ruled the same way, but have not had time to investigate it. In studying up this matter some thirteen years ago in a case where I was personally interested, I found many authorities sustaining this view. I also found many to the effect that one of sound mind and of legal age could contract himself out of the operation of laws made for his protection. But there were so many the other way that I then concluded a mere naked contract for the delivery of water

at a future date was unsafe and the point should be covered in other ways.

This is only another of the many instances of the unfitness of our laws to cope with new conditions. Judges have to take the law as they find it, which is right or we would have no law. But there are cases of applying old law to new conditions where they might strain the old to advantage. The application of the riparian doctrine to our arid states, for instance, could be easily avoided by saying that if England had been a dry country instead of a wet one, she would have announced in thunder tones that water was public wealth and no man had a right to waste a drop of it by playing dog in the manger. In the same manner if this question had first arisen in irrigating countries, where the judges knew the requirements of irrigation, they would have said it is of the utmost importance to both parties to have this matter fixed from the beginning and perpetually and they are therefore at liberty to make contracts in contravention of laws made for the protection of those who are not wise enough to protect themselves.

If parties are not allowed to make such contracts, consider for a moment the consequences and see how important it is that this should everywhere be put beyond doubt by constitutional amendment or legislation. For capital is already well apprised of the fact and the building of one large system in California has been already suspended by this danger. And it will not be long before it is everywhere aware of it. And if it is the law then no man of sense wants to make any permanent improvements under any ditch that is subject to such rules. For it is worse for the land owner than for the company. In the case mentioned the land owners were all dumbfounded for they were satisfied with the contract and pleaded it against the right of the company to raise the rate. And well they might be astonished, for it took but a minute to foresee the possible results.

It is impossible to make irrigation works from which all consumers can draw at will as from city pipes. Aqueducts cannot be made large enough for irrigating heads for everyone at once, and the waste would be enormous if they could be. Rarely can over ten per cent of the consumers be supplied on the same day, often not over five. There are ditches in which it takes thirty days to get all around with full irrigating heads and this time can be shortened only by reducing the heads so that they are of little value for the heavy work of mature trees or fields of alfalfa.

It is therefore of the utmost importance to the irrigator to know how much water he is to have before he can safely make any permanent improvements. The stipulation of the quantity is the most valuable part of his contract. He cannot tell exactly on what days he will have it, or in what heads; but in practice he gets it so nearly that there is rarely any dissatisfaction on his part. He wants to know, too, that the rates cannot be raised on him by any tampering with the

supervisors. And the fact that they may be composed of farmers of the real old honest type does not lessen his fears a particle. He also wants his land under a company that can keep up its works, and knows that the running down of the works means loss to him. He don't want the company injured at any time by any demagogical racket about rates that may result in making them too low. He wants them high enough to make efficient service and good maintenance of the ditch, and for himself and his heirs is not afraid to trust his own judgment as to what is such a sufficient sum.

Now steps in the law and says—"No sir this is all illegal. The rates will be fixed by competent authority, you will step up to the office and pay those rates and get the water—*They having the water.*"

These last words are in the decisions and constitute a little joker of tremendous proportions to those who know what it is. The courts are right in inserting them as a proviso for no law can make companies furnish more water for irrigation than they have. And it is likely that for several years, at least, it will be left to the companies to say how much money they have and how much water they can get for it.

There is no way to make a company take more water out of a stream than it thinks advisable and no way to make it increase the height of a dam. In the absence of any contract to carry water for any one it is extremely doubtful if a company would be liable for allowing water to run past the head of the canal without taking it in, even if it belonged to the company by unquestioned title. The difficulty is in the remedy more than in the right. But as there are most always some other rights on the stream it is almost impossible to say how much a company would have to let pass at the different stages of the stream. In some way or another it will be found that the company has control of the matter through the control of the evidence. But where they are furnishing water under a contract, it is their business to have enough except in unusual seasons, perhaps. And there are hardly any instances of a company refusing to carry out such contracts to the best of their ability. He who owns water by contract and the good will of a company has it by the best title in the world.

It is said that there is no such thing as a "water right" because a company is bound to furnish water to all applicants on tender of the rates fixed by the proper board. As a strict legal proposition this is true. As a practical business proposition there is such a thing as a water right, always has been and always will be. It is impossible to operate irrigation works with safety to the land owner in any other way. The lawyer who tells you there is no such thing is not half as wise as he thinks himself and would do well to study human nature, irrigation and its requirements as well as abstract principles drawn from entirely different circumstances.

It is generally supposed that buying a "water right" is buying the privilege of buying water. This is the narrow view of ignorance.

If it were merely a means of extorting more money from the consumer it could not have survived as long as it has, could not have been so universal, and could not have been acquiesced in by so many smart men and so many stubborn fighters. No one of sense has ever contested it. The only man in California who ever did, spent ten years in litigation, and lost his forty acre place with a mortgage to cover the expenses. He had no trouble in getting the ruling of the court in his favor on the abstract proposition that a company was bound to furnish water to all applicants on tender of the rates. But the courts never could make the company furnish water that they did not have. And in some mysterious way there was always a shortage of water in the ditch about the time he wanted to irrigate. Other consumers had somehow got ahead with their orders and had to be taken care of. During the whole period of litigation his place remained dry while thousands of acres around were in the highest prosperity in the world.

Any man of sense might know that trees and vines will prosper better on water had by contract and the good will of a company than on water secured at the tail end of a lawsuit. And the law suit does not settle the amount of water to which he is entitled, the times at which he is to have it, the heads in which he is to have it, or the length of time he is to have the the run. All these are almost as important as the question of any water at all. They could not be determined for the future by any court, or even by the company, without tying up the whole system in a cast-iron snarl of the worst kind. These matters must be left open to be arranged each time according to the needs of the consumers, the kind of crops they have, the pressure of hot weather upon them, the time at which they get in their orders, the number of those wanting heads on the same day, the size of the heads thus wanted, and a score of other matters that can hardly be foreseen, such as a shortage of rainfall, against which no company can safely provide. In such cases a pro rata distribution must take place and such is always the case in the land-owner's companies. The capabilities of a country cannot be limited to what may happen once in many years. It is better to irrigate a large area and go short occasionally than to base the whole on the minimum. Works are therefore based on the average flow of streams or average rainfall, with a provision for pro rata when below the average. Such provisions work very well in practice, for a shortage is no more, and generally much less, than what one will have to stand who depends on the rainfall for cultivation anywhere in the United States. In such cases it would worry the best of courts to determine the right of one whose only claim on the works was that of one making a tender of the rates. He will be quite sure to be postponed to every one else and every one else would be only to happy to assist the company in relegating him to the rear and in helping beat him in case he sued for damages.

Remember always that irrigation works are not analogous to city

works and that no one can tap the line at pleasure. He can get water only as it is turned out to him on certain days and in certain heads and for certain lengths of time. It is impossible to operate works any other way unless made of enormous size. Every consumer knows that the determination of these questions must rest with the company. For any one to set up his will against them would be like rebelling against a government. Anarchy of a kind most fatal to all crops would be the sure result. The man who tries to get water without taking a contract by taking advantage of the law is therefore not only in the power of the company, but every one who has had sense enough to get a contract is interested in beating him. He has no equity on his side, for every one knows that the annual rates rarely amount to more than enough for good maintainance and that one who tries to get water for the rates only is trying to get it for much less than it cost. They know that such a principle, if generally applied, means the death of all enterprise in building any new irrigation works. Hence they are interested in sustaining the water right, while almost every question of importance if decided this year, such as the quantity of water one is to have, may be fought over anew next year against the man who tries to irrigate without one.

The man with a contract stands in a vastly different position. The difference is well worth paying for. This is why nine hundred and ninety-nine out of a thousand pay it without any question of the existence of such a legal thing as a "water-right." For this reason every man of sense will always want a contract and will refuse to plant trees or even alfalfa under a ditch that does not give him one. His rights under anything else are entirely too vague and slippery. With a contract the amount of water to which one is entitled is specified, a matter of the utmost importance. He is put on the list of consumers and the company looks after him with care. It saves so much water for him and accommodates him in every way possible, consistently with the needs of other consumers. It cannot, with safety to other consumers, specify in advance the days on which he is to have water, the size, or duration of the irrigating heads he is to have, but as the company has bound itself to furnish him so much water in a year it has no interest in treating him any differently from any other consumers—mark this point well—and it accommodates him to the utmost consistently with the rights of others. In case of a shortage from an unusual season the same rules are applied and he stands with the rest of the consumers. He therefore knows almost to a certainty what he is to have and can tell very nearly when he is to have it if he gets in his order in time. He therefore knows what he can plant and what he can do with it and can figure years ahead on everything but an unusual season. And even then he knows he will get his share which will be enough to make something of a crop even though short, while he is in no possible danger of losing anything for want of water. The dangers of any other system are too great for any one to invest either time or money in. Almost any one can figure them out but we will glance at some of them in the next article.

ANNEX ARID AMERICA.

“IN UNION THERE IS STRENGTH.”

The Cheyenne Irrigation Congress should hew out a broad national policy that all can unite on who want Arid America Annexed by Irrigation.

BY GEORGE H. MAXWELL.

While we hear so much about “annexation” would it not be well for the people of this country not to lose sight of the fact that we have an empire right in our midst which is today a desolate waste, but might be reclaimed and added to our fertile national domain by the construction of irrigation works which would be far less costly than ships and soldiers.

The cost of one week of the war would build an irrigation system which would reclaim a million acres, and just as much add it to our territory as though we had annexed a new island in the ocean. The building of the works would be a labor of creation, not destruction. Every dollar disbursed would give employment to wage-earners who are without work, relieving suffering at home and in our midst, and creating new laws on which these same wage earners, when their labor had reclaimed it, could upbuild rural homes which, in the words of our Secretary of Agriculture, would be “safeguards of the nation”—far stronger and more enduring bulwarks of our liberties than any forts or navies.

This great question of the reclamation of the arid public domain, and the creation of sufficient water supplies for the irrigation of all of arid America that can be reclaimed, is no longer a dream of the future. It is a problem of today, staring the people of this nation in the face, and like Banquo's ghost, it will not down. It must be solved. The lands are needed for homes. There is an appalling and cold blooded cruelty in a national indifference which allows hundreds of thousands of willing workers to be in want in the great centers of population in the east, while millions of acres in the west need but their labor to be transformed from worthless wastes into happy homes for these same workers.

Governor Mount, of Indiana, has stated this great problem in words so strong and vigorous that they ought to be read and pondered by everyone who has the welfare of this country and its people at heart. In a letter recently published in the Los Angeles Times—a journal which is a strong advocate of the policy of the reclamation by the federal government itself of its own arid lands—Governor Mount said:

“Two important problems are before us, viz.: ‘The Unemployed’ and ‘Our Arid Lands.’ A policy that would furnish to the idle remunerative employment, and fruitfulness to our desert places, would prove a blessing to humanity and a boon to our country. A policy that would relieve the congested cities and supply the crowded inmates with homes that would develop manhood and womanhood, furnishing employment, teaching habits of industry and frugality, would be building for our nation’s future on the solid rock. The country is the nation’s hope. Rural life is conducive to purity of character. The



GOV. JAMES G. MOUNT, of Indiana.

exaltation of agriculture, the application of science to farming, the encouragement of migration to the country instead of to the city, the transforming of waste places into smiling plenty, will do more for the nation’s prosperity, development and happiness than any suggestions offered to the public. I do not know that the people are ready to co-operate to this end, but I do believe true wisdom invites to such methods.”

There is a platform for patriotism to stand upon, to labor for the grandest cause which is before the American people to-day; and one

on which all who desire the nation's prosperity can unite and work together in harmony. Humanity, charity and philanthropy are appealed to just as much as the activities and interests that are working for the development of the material resources of the nation.

Unity of thought, purpose and action on the part of all who want to see arid America peopled and prosperous is all that is needed to accomplish it. When they have united the east will join with the west to promote the common prosperity of the whole people, by opening up the great fields for industry, energy and enterprise which lie latent all through the great arid west, waiting but for the magic touch of water which labor will put upon the land. Then, and not until then, we will realize the fulfilment of the great prophecy of speaker Reed when he said:

"Every wise man agrees that beyond the Mississippi lies the great wealth of the days to come. In the development of this wealth we are all interested, and we in the east are not the unwise men to believe that we are not concerned in the progress and future of the west."

The Phoenix Irrigation Congress outlined the broad ulterior purpose of the irrigation movement when it framed "an appeal to the American people" in these words: "We urge upon the American people the profound importance of the social, political and philanthropic features of this grand irrigation movement, its ultimate aim being that we may become a nation of rural homes, rather than a nation of great cities."

The chief differences in the past among the laborers in the field of irrigation development in the west, have arisen from the varying views entertained by the respective advocates and opponents of the cession of the arid lands to the states. On this subject the Phoenix convention declared in favor of a policy which would give to the states full opportunity to reclaim and settle the arid lands within its borders, and substantially endorsed the Carey Act granting a million acres to each state on these conditions.

All agree that the result to be attained is the actual reclamation and settlement of the land by home builders. Why not then agree on a policy which will give to both state and nation the fullest scope for both to work to this end. The most pronounced advocates of state cession raise no objection to the federal government reclaiming its own lands. They turn to state cession only in the hope of finding along that path a shorter cut to the desired ultimate result.

The simple fundamental principles which are to be the foundation of the structure must first be found. The elaboration of details is a matter to come after, and the Irrigation Congress in its brief session cannot expect to cope with the adjustment of these details. It should not try. Time and study and investigation are necessary for that; and this must be done by men specially familiar with the field they are working in, with the conditions they must cope with and with

the ultimate end to be achieved. The declaration of the fundamental principle is all the Irrigation Congress should undertake to formulate. The principles it put forth in the last two sessions of the Congress at Phoenix and Lincoln were broad and sound ground. It should adhere to them closely. But there remain yet some other propositions to be evolved, for instance, the problem of the forests and the grazing lands.

Why could not these principles be crystalized along the following lines, and when so formulated have the united advocacy and support of the Irrigation Congress.

ARID LAND RECLAMATION.

(Resolution of the Phoenix Irrigation Congress.)

We favor the construction by the federal government of storage reservoirs and irrigation works wherever necessary to furnish water for the reclamation and actual settlement of the arid public lands.

UNITED OWNERSHIP OF LAND AND WATER.

(Resolution of the Lincoln Irrigation Congress.)

The value of the irrigated farm and the security of the homes thereby created are alike dependent upon sufficient public control of the water supply, and the prevention of water becoming a speculative commodity. We believe that the waters of all streams should forever remain public property, and that the right to its use should inhere, not in the individual or the ditch, but in the land reclaimed.

CONDITIONAL STATE CESSION.

(Resolution of the Phoenix Irrigation Congress.)

We favor the cession of the public lands of the nation to the respective states and territories only upon conditions so strict that they will insure the settlement of such lands by actual settlers in small tracts, and absolutely prevent their monopoly in large bodies under private ownership.

FEDERAL STORAGE RESERVOIRS.

(Endorsement of the Chittenden Report.)

We favor the preservation and development of our national resources by the construction of storage reservoirs by the federal government for flood protection and to save for use in aid of navigation and irrigation, the flood waters which now run to waste and cause overflow and destruction.

LEASING OF THE GRAZING LANDS.

(Endorsement of Recommendation of Elwood Mead.)

We favor the leasing of the public grazing lands at a nominal rental in limited areas to settlers tilling adjacent lands, the revenue from rentals to go to the states for irrigation development, leases to be subject to right of reclamation by irrigation and of settlement on lands actually cultivated, title to land to remain in federal government until actual settlement.

But the Irrigation Congress should do more than convene, resolve and adjourn. It should be a permanent organization, with active officers and committees earnestly, patiently and persistently at work to carry out the broad purposes set forth and declared for at the annual session of the Congress. This has not been done in the past and as a consequence the influence of the Congress has not been what it might have been and ought to have been. Will not the coming Congress consider whether much might not be accomplished in this way? The time has come for results, and unless something is soon achieved, interest in the Congress will surely wane, and gradually die out. Let it bring about some one result, so it can point to it and say: "There! The Irrigation Congress did that!" Then public interest in irrigation development would center on the Irrigation Congress, and its influence for good would widen with each year.



THE NATIONAL IRRIGATION CONGRESS.

The Seventh Annual session of the National Irrigation Congress, which is to be held in Cheyene, Wyo., Sept. 1st, 2nd and 3rd, promises to be a most successful affair. The purpose of the congress, briefly stated, is to awaken the people to the need of added state and national legislation on the subject of reclaiming the arid lands of the country. Every state should be interested in this great question. The meetings of the congress are open to the public and an invitation is extended to all interested in irrigation matters to attend. Besides the papers to be read by engineers, scientists and authorities on irrigation matters, and the discussions of the same, the committee will make it a point to make plain what may be expected through irrigation, by showing on the grounds, what it is possible to do under this system of agriculture.

The following is the program for the coming session.

THURSDAY, SEPT. 1, 10 A. M.

Congress called to order by the president, Joseph M. Carey.

Address of welcome by; Hon. William A. Richards, Governor of Wyoming; Hon. William R. Schnitzer, Mayor of Cheynne; and Rev. E. E. Smiley, President University of Wyoming. Responses, and appointment of committees.

At the afternoon session, beginning at 2 p. m., the committees will report. permanent officers will be elected and installed and addresses will be given by the officers elected.

In the evening there will be a reception at the state capitol.

Friday and Saturday will be given up to the reading and discussion of the following papers:

Discussion of the Water Right and Agricultural Problems which have arisen in the development, by irrigation, of the several arid states and territories, and of the methods of administration in force, or needed, in these states and territories.

The Success and Failures in Canal Building and the causes thereof. Discussion led by Col. E. S. Nettleton, Denver, Col., and participated in by J. C. Ulrich, Esq., Denver, Col.; Samuel Fortier, Esq., Ogden, Utah; S. L. Wiley, Esq., Omaha, Neb.; J. D. O'Donnell, Esq., Billings, Mont., and others.

The Obstacles to Settlement in the Arid Region and the Best means of Overcoming Them. Discussion led by Wm. E. Smythe, Esq., and Prof. Elwood Mead, State Engineer of Wyoming.

Laws and Regulations to Promote the Best Use of Water in Times of Scarcity. Discussion led by Hon. John E. Field, State Engineer of Colorado.

The Need of Special Tribunals for the Settlement of Water Right Controversies. Discussion led by Hon. J. M. Wilson, State Engineer Nebraska.

The Duty of Water and its Relation to the Adjudication of Water Rights. Discussion led by Robert C. Gemmell, Esq., State Engineer of Utah.

PRESENTATION OF SPECIAL PAPERS.

Discussion of the Relation of the State and National Governments to the Further Reclamation of the Arid Territory by Irrigation.

The Need of National Aid in the Construction of Storage Reservoirs and Important Irrigation Canals. Discussion led by Hon. G. H. Maxwell, San Francisco

The Construction of Storage Reservoirs Under National Supervision. Col. H. M. Chittenden, U. S. Army Corps Engineers, or his representative.

The Management and Disposal of the Arid Public Lands. Hon. John H. Shafroth, M. C. for Colorado.

Irrigation Machinery for Persons of Limited Means. Prof. Barbour, University of Neb.

The Management of the Grazing Lands and Their Use as an Aid to Irrigation Development. Hon. L. H. Taylor, Reno, Nevada.

What Congress is Doing in Aid of Irrigation. Hon. F. E. Warren, U. S. Senator from Wyoming, Hon. William R. Ellis, M. C., from Oregon.

The Measurement of Streams and its Relation to Irrigation Problems. Hon. F. H. Newell, U. S. Geological Survey.

Forestry. Prof. J. L. Budd, Iowa Agricultural College.

The National Forest Reserves.—Relationship of Forestry and Irrigation. Hon. E. F. Best, Interior Department, Hon. W. W. Barrett, Superintendent Forestry and Irrigation, North Dakota.

The Work of the Agricultural Experiment Stations in Aid of Irrigation. Prof. S. M. Emery, Bozeman, Mont., Prof. L. G. Carpenter, Fort Collins, Col., and Prof. B. C. Buffum, University of Wyoming.

Report of the Committee on Resolutions was presented.

Other subjects will be added and changes made as speakers are heard from and selected by state delegations. A large number of valuable papers are expected from specialists and scientists.

A free excursion to visit the canals and reservoirs of the Wyoming Development Company, Wheatland, will be tendered the delegates to the Congress and their friends.

THE DIVERSIFIED FARM.

In diversified farming by irrigation lies the salvation of agriculture.

THE AGE wants to brighten the pages of its Diversified Farm department and with this object in view it requests its readers everywhere to send in photographs and pictures of fields, orchards and farm homes; prize-taking horses, cattle, sheep or hogs, Also sketches or plans of convenient and commodious barns, hen houses, corn cribs, etc. Sketches of labor-saving devices, such as ditch cleaners and watering troughs. A good illustration of a windmill irrigation plant is always interesting. Will you help us improve the appearance of THE AGE?

AN ANSWER FROM DR. GAPEN.

[In answer to the correspondent from Texas, who last month wrote to the AGE for information regarding irrigation, especially as to the manner of conducting water from a main reservoir to different parts of the ground, we give the following contribution from Dr. Clarke Gapin, of Madison, Wis., who is authority on irrigation.—Ed.]

Your subscriber does not give sufficiently full information as to the relation of the water available to his land. I infer however, that he does not need a pumping outfit but a method of conveying water. The most economical method is by the open ditch—this costs only the surveying and making. To attempt to convey any large amount of water through a pipe would be quite expensive. The best and most economical pipe for the purpose, however, is the spiral weld steel pipe made by Abendroth & Root, of Pittsburgh, and which ought not to cost laid over 25 cents per foot for 6-inch pipe. Such piping, however, is rarely necessary when pumping is not required. If pumping is required and he has a reservoir or can make one, he can depend upon a good sized windmill to fill his reservoir with sufficient water to irrigate ten acres or less. But he must have a reservoir if he uses a windmill. If he has no reservoir and must use a pump, a small gasoline pump will answer his purpose.

As to the practical work of irrigation, that is very simple. By whatever method he brings his water to the land he there empties it into a main ditch which must

be so located that water will flow from it on to the land to be irrigated, remembering all the time that practical irrigation depends upon the familiar fact that "water will run down hill." To control the flow of water he needs some galvanized iron dams—one or more of a size sufficient to extend across his main ditch, and several of a smaller size for the furrows. The former should be about 2½ to 3 feet across and the latter about 15 inches. Both should be cut convex on the lower end and strengthened by a board handle riveted across the upper side.

With the larger size placed across the main ditch he diverts the water between as many rows of vegetables as he wishes, usually five or six at a time, and with the smaller ones placed across the ditches between the rows he prevents a too rapid flow of the water, if his land slopes rapidly. If the slope is gradual he will rarely need to use the smaller dams, as by the time the water has flowed the length of a row it has sufficiently soaked the ground.

To make the ditches between the rows he needs what is termed a "middle breaker," or in place of this an old style shovel plow will do very well. This he runs between the rows of potatoes, corn, sweet potatoes, etc, In irrigating onions, beets, etc., which are planted in rows close together, it is customary to leave out every sixth row and use that space for the ditch. The water is then dammed at intervals across the five rows from ditch to ditch, and made to flood the space between till the ground is well soaked. The dams are

then taken up and passed on for a distance and the flooding repeated. It is a rule with irrigators to begin at the lowest point or side of the land and work upwards toward the main ditch. They are thus enabled to have dry ground to stand on most of the time. The beginner is nearly always afraid of getting on too much water. If the soil is well drained, as all irrigated land should be, there is no danger of too much water. The danger is too little. The enormous amount of water consumed by a growing crop is incredible to one who has not looked into the matter. (See Prof. King's book on "Soils.") For the practical details of the work of irrigation the beginner would best get a work on this subject, of which there are a number published, or better still go somewhere and see the work done. It is so simple that a few days spent with a practical irrigator in a field will enable anyone with intellectual resource to take it up.

Irrigation before planting is very important and profitable and very simple. To do this it is only necessary to plow the land into ridges by throwing the furrows toward each other and run the water between the ridges. After allowing sufficient time for the surplus water to drain off, the land is ploughed, harrowed and planted. This is perhaps the best of all irrigation. The crop gets a good start and stands well.

With a good start a crop needs irrigating only twice or three times during the growing season. It is impossible in a short article to go into all the details, but the work of irrigation depends upon such simple principles that when one gets started at it he becomes so interested that he soon works out the practical details for himself. My injunction would be in short: First, be sure of plenty of water—not less than 200,000 or 500,000 gallons per acre for the season, depending upon the rainfall which has to be supplemented or want supplied. Don't be afraid of using too much water and remember that

it always runs down hill, the latter, even when it sometimes appears to run up hill. It is often necessary to lay out the main ditch in a very circuitous manner so as to keep it higher than the land to be irrigated and to avoid too rapid a descent and a consequent too rapid flow of water.

The dry season has caused great loss to stockmen on the Sierra foothills. It is estimated that 175,000 sheep were driven into the forest reservations after the withdrawal of the United States cavalry some time ago. Recently a force of deputy marshals forced the stock owners to remove their cattle and sheep from the reserved lands. Some of the herders assert, as there is no grass and little water to be found elsewhere, at least 100,000 sheep must perish of starvation and thirst.

The New Jersey experiment stations practice crop rotations, and six of the principal systems are as follows, corn being planted the first year in all of them:

Second year, oats; third year, wheat or rye; fourth year, clover. Second year, potatoes; third year wheat or rye; fourth year, clover. Second year, wheat or rye; third year, clover; fourth year, timothy. Second year, potatoes; third year, clover. Second year, potatoes; third year, potatoes; fourth year, melons. Second year, potatoes; third year, tomatoes; fourth year, clover.

The Massachusetts *Ploughman* says that dried blood is rapidly gaining favor with western experimenters as a food for cattle, sheep and hogs. It is mixed with meal and baked in cakes and fed in this way. A very little of the blood is sufficient. This has not as yet come into general use among farmers, who have so far only used the dried blood as a fertilizer.

A California man and his wife recently arrived at Ventura from a trip of 454 miles on their wheels.

PULSE OF THE IRRIGATION INDUSTRY.

SUB-IRRIGATION A SUCCESS.

The present season is the dryest that Southern California has known for years, and while the lack of water has been a detriment to the country, as a whole it has demonstrated some things that never could have been known with certainty without the test of a dry year. One thing that this summer is demonstrating is that a section that has a sufficient supply of water for irrigation purposes this year need have no fear for other years. Another thing that the dry year has shown up is the fact that some places that had claimed a sufficient water supply must secure an increased amount of the precious fluid in order to make them safe in extremely dry seasons.

A third and very important test has been that to which the present dry season has subjected those sections which depend on sub-irrigation for the sustenance of tree and plant life. In most of these sections the results have surprised even the most sanguine believers in the theory of sub-irrigation. There has been absolutely no sign of a lack of the usual amount of moisture, and trees have made as much growth as in other years when the surface water supply was much greater.

A representative of the *Record* recently visited the Sierra Madre colonies lying south of North Cucamonga. This is one of the tracts in which sub-irrigation is certainly a marked success. There is not a single sign of drouth to be seen anywhere on the whole tract, and the flourishing condition of the trees cannot but convince the most confirmed skeptic that sub-irrigation in the Sierra Madre colonies has passed successfully through the experimental stage.

Not only are the peach, olive, prune and apricot trees holding their own during the present dry season, but they are making a steady and rapid growth, and the older trees are maturing good crops of fruit. In fact the trees could not be in more perfect condition if there had been surface irrigated at frequent intervals. Trees not far distant that have been irrigated regularly

since they were set out do not show a single advantage over the sub-irrigated trees in condition or growth, while the fruit from the sub-irrigated trees is of superior quality to that which comes from the surface irrigated trees, and command higher prices.

The secret of the splendid condition of the trees in the Sierra Madre colonies is not difficult to find. One has but to remove a few inches of the surface soil to find the ground thoroughly penetrated with moisture and from this never failing store the trees draw the essential life giving fluid.

Indian corn that was planted after the winter rains is in a flourishing condition. The stalks average four feet tall and are living demonstrations of the fact that the dry season has not affected the Sierra Madre colonies.

The fine conditions of the trees in these colonies is attracting wide spread attention and the increased demand for these properties has resulted in an advance in values throughout the entire tract.—Ontario (Cal.) *Record*.

IRRIGATING FROM A RESERVOIR.

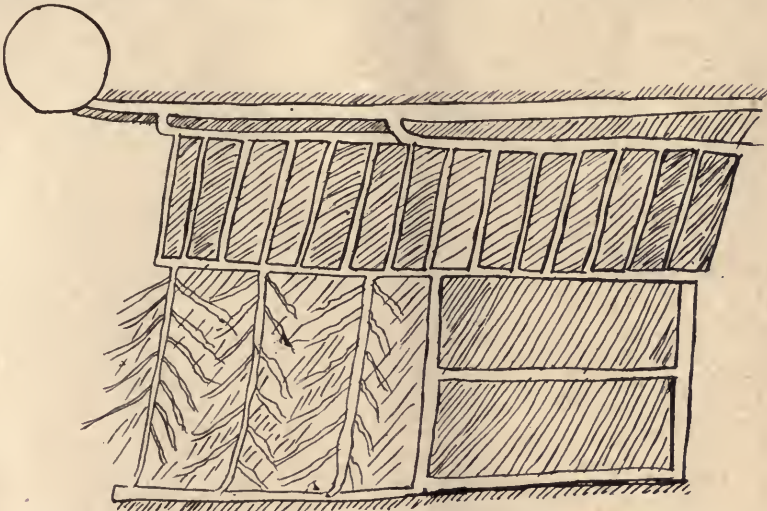
A reservoir is the surest and cheapest source of water supply for irrigation, where the natural flow of streams has been appropriated or there is a scarcity during the summer months. The reservoir may be constructed in the mountains or upon the farm where water is required, and filled from the flood water of streams, by claiming a spring; tapping the artesian basin by sinking wells, or tunneling for the underflow. Sometimes wheels or pumps may be used advantageously in lifting water from rivers and impounding it in reservoirs, to be used as necessity demands. If a reservoir is built in the mountains it should have more or less strong masonry work where the weight on the dam is greatest, as the leaf mold and surface forest earth will not hold a very great volume of water. Many reservoirs have bursted, and destroyed homes and farms in the valleys below because the

mountain earthen dams were insufficient to hold back the water, when the soil became thoroughly soaked. The mountain reservoirs constructed in natural draws or basins seldom leak, and the evaporation is not so great as in the valleys, but they should be puddled with clay to insure an impervious bottom.

The reservoir should be so located as to be filled and emptied easily and cheaply, and if on the farm, ought to be at the highest point obtainable. Under ordinary circumstances, where less than 1,000 acres are to be irrigated, the reservoir should be round or elliptical, to prevent cutting the banks and filling with earth from erosion, and occupy a space of two to ten acres.

to prevent an overflow from the tides of the ocean.

A wooden flume, pipe or culvert built in the wall at the proper height, makes the best outlet for a reservoir, while a similar device may be used for an overflow. The gate can be made of iron or wood and so constructed as to be quickly lifted or put down by a handle extending above the water. The mains for conveying water to the fields may be mere open ditches, cut or plowed on a line admitting of a fall of four feet or more per mile. This should vary with the nature of the soil, the gravelly surface having greater and the sandy less fall per rod, depending on the extent the surface will wash. Water may be con-



RESERVOIR WITH FURROW, FLOODING AND SEEPAGE IRRIGATION.

The greater the depth of water the less evaporation, and the smaller the space the less destruction from waves, but deep reservoirs require strong, well constructed dams, and are more dangerous than the shallow enclosures. A bank seven feet high should be about thirty feet on the bottom, with a slope of two feet on the inside, one foot on the outside and four feet or more in width at the top. The banks should be covered with trees, willows or grass to prevent washing, and the reservoir fenced to keep away cattle and sheep. One of the best soil retainers and something that ought to be planted on every reservoir and ditch bank is the marram grass used on the sand dunes of the coast

veyed in wooden boxes, V shaped flumes or clay pipes, from the reservoir to the field of distribution with greater economy than by using open ditches, if the farmer has sufficient capital to put in these improved conveniences. If a swale must be crossed with the main, a good plan is to throw up a grade, similar to a roadbed, and when thoroughly settled cut a ditch through the center. An elevated flume is frequently better and cheaper than throwing up a grade, and is the only plan for crossing a canyon or ditch, except constructing a gravity canal for some distance up and down the mountain slope.

Laterals are made to run parallel with the main, and each cut in the canal draws

off part of the water, making distribution easier and enabling the irrigator to handle the volume without washing away the surface soil. The modes of distributing from laterals are through furrows, flooding, seepage or percolating ditches, depending upon the nature of soil, volume of water and kind of crops under cultivation. One method adopted by many western farmers includes the different systems of the irrigation. The furrows are used in irrigating the general crops, such as corn, potatoes, vegetables and cereals, water being taken from the laterals and equally distributed in the furrows. A waste ditch collects the surplus passing through the furrows, and delivers it to an alfalfa field or orchard where it scatters over the surface in wild flooding. If a low bottom or meadow is attached to the farm, as is generally the case in the western river sections, the water, after irrigating the cultivated area and orchards by furrows and flooding, is conducted into seepage ditches from which it percolates through the native sod and produces the wild hay meadows.

The long-handled shovel is undoubtedly the best tool for making dams, cutting ditches and general distributory purposes, but some irrigators prefer a strong, broad bladed hoe. Water may be diverted from mains to laterals and from laterals to furrows by throwing in a few boulders, or making dams of sod. Sometimes a cloth dam serves the purpose admirably and cheaply. This consists of a piece of ducking sewed or tacked to a short stick or pole which is dropped across the ditch, and a shovelful of earth thrown on the loose end of the cloth forms the dam by holding it in place. Small square boxes sunk in

the head of the furrows prevent washing the plowed land and keep the water from cutting and all running into one furrow. A handy dam may be made of a board cut in the shape of the letter D with sharp edges on the curved line, to allow of sinking the board in the moist earth at the bottom of the ditch. This is very useful where the ditches are of similar dimensions, and saves much digging of the banks for building dams. It may be carried about and used at any point when necessary. Wooden headgates are better than earthen dams for opening and closing the mains and dividing the flow of a canal.

JOEL SHOMAKER.

FURTHER WATER DEVELOPMENTS.

No corporation in Southern California has shown more activity in water developments this dry season than the Covina Irrigating Co.

With the completion of the Lordsburg plant, and the closing of the contract with the San Gabriel Power Co. for a tenth of the San Gabriel River, they at once turn their attention to the San Jose tract, where extensive recent developments have been made. Having secured an option on a portion of this tract, southwest of the Deacon well, they are now engaged in sinking a test well thereon, which it is hoped, will be completed with the pump installed by September 10.

Superintendent Elliott informs us that he will work a force of 40 men next week, laying the 1500 feet of pipe and flume to connect the well with the main ditch of the company. Unless some unlooked for difficulties should arise, water from this source will be turned into the main ditch by September 10.—*Covina* (Cal.) *Argus*.

ODDS AND ENDS.

Wilhelmina, who is to be crowned Queen of the Netherlands on September 6 next, has personally sent to Mr. Bok, the editor of *The Ladies' Home Journal*—himself a Hollander by birth—one of her private portraits for publication in the next number of his magazine. It is the last portrait which will be taken of the little lady before her coronation, and will be printed in connection with a specially prepared sketch, showing the personality of the first Queen of Holland from every point of view.

Mr. George E. Graham and Mr. W. A. Goode will contribute to *McClure's Magazine* for September, accounts of the destruction of Admiral Cervera's Fleet as witnessed by themselves from Commodore Schley's flagship, the "Brooklyn," and Admiral Sampson's flagship, the "New York." They represented the Associated Press, and were the only correspondents aboard the American ships at the time of the battle with Cervera. The articles will be very fully illustrated, largely from photographs of the actual scene, taken by the authors. The illustrations will comprise portraits of all the commanders, Spanish as well as American; pictures of all the ships; views and diagrams of the battle in its successive stages; and views of the wrecks of the Spanish ships taken soon after the battle closed.

Richard Harding Davis in the September *Scribner's* says: "Some of the comic paragraphers who wrote of the Knickerbocker Club dudes and the college swells of the Rough Riders' organization, and of their imaginary valets and golf clubs, ought, in decency, since the fight at Guasimas, to go out and hang themselves with remorse. For the same spirit that once sent these men down a white-washed field against their opponents' rush-line was the spirit that sent Church, Channing, Devereux, Ronalds, Wrenn, Cash, Dudley,

Dean, and a dozen others through the high hot grass at Guasimas, not shouting, as their friends the cowboys did, but each with his mouth tightly shut, with his eyes on the ball, and moving in obedience to the captain's signal."

One of the brightest country papers that comes to the AGE is the *Culbertson* (Neb.) *Era*, published by Ira Cole. It is an evidence of editorial brains and enterprise of which Mr. Cole may well be proud.

The *American Farmer*, in a recent issue, suggests that the hen be made the national bird of America instead of the eagle, claiming that while the latter is a cowardly, thieving creature, never earning anything honestly but preying upon weaker animals, the hen attends strictly to business, and often furnishes us with eggs for years, finally giving her life to feed some hungry boarder, who fancies he is eating spring chicken.

Colorado, it is said, is becoming famous as an onion state, while Wyoming is the great potato producing state, having a record of 974 bushels and 49 pounds from one acre.

One of the Mormon pioneers recently died at Salem, Utah, aged 86 years. He joined the Mormon church at Millford, Mich., in 1834, going to Utah in 1847. He had twelve children, eighty-three grand children, twenty-eight great grand children and three great great grand children.

HER DESPERATE REVENGE.

She was only 4 years old, but she had been naughty, and her mother punished her. The little one was very indignant, and said tearfully and angrily: "You just wait till the next time you and papa go out, I'll do the awfulest thing you ever heard of!" Her mother, thinking the child was simply trying to frighten her,

asked what she proposed to do. The child refused to tell, and the mother and father went out that same day, thinking no more of the matter. When they returned the child met them with: "Well, I did it; I did the most awfullest thing you ever knew about." "What was it?" asked the mother. "I just swallowed three catapillars, two fuzzy ones and a brown one," answered the youngster. The returns are not yet in as to the child's present condition.—Ex.

Edward Everett Hale can almost say "I told you so" in regard to the war just ended, as he predicted that it would be over in sixty days.

There is a report current that a printer recently committed suicide by hanging himself with the office towel. This bears the stamp of falsehood right on the face of it, for anyone at all familiar with the article knows that it would be utterly impossible to hang oneself with the "office towel." That it might have caused his death, we admit; he may have stabbed himself with it, or butted his brains out against it; or the towel may have fallen on him and crushed him. All these things are possible, but that he *hung* himself with it—oh no!

Since the curfew law has been passed and become effective in so many cities and villages, progressive western women, notably of Kansas, are thinking of having a somewhat similar law by which their husbands will be obliged to be at home at a certain hour—say 10 o'clock—at night.

HE KNEW.

The late war has been instrumental in doing away with the hatred against the rich. It is told that a young millionaire gave up his life of luxury to serve the nation among the naval militia. One day he was scrubbing the deck of one of the battleships in New York harbor under the supervision of an old tar, when a fine pleasure yacht steamed by. "By heavens! there is a dream of a boat. I wonder

what she cost?" asked the old sailor. "About \$800,000," replied the recruit. "I know, 'cause she's mine!"

An editor is a millionaire without money, a congressman out of a job, a king without a throne. He constructs without hammer or saw, builds a railroad without rails or spikes, and farms without a plow. He runs a butcher shop in the journalistic world and deals out brains for cash or credit. He loves those who advertise with him as a brother. The editor is a teacher, a lawyer, a preacher—he sends truth out to save souls and gets lost himself. He heals the wounded, cares for the dying, rescues the perishing and then starves himself when a ham sandwich of kindness would jerk him from the jaws of death.—Culbertson (Neb.) *Era*.

A GIRL'S COMPOSITION ON BOYS.

"Boys is men that have got as big as their papas, and girls is young, but will be bigger soon. Man was made before woman. When God looked at Adam He said to Himself, 'Well, I guess I can do better than that if I try again,' and then He made Eve. God liked Eve so much better than He did Adam that there has been more women in the world ever since. Boys are a trouble; they are very wearin' on everything but soap."—Ex.

THE POTATO AS A PRIZE CLEANSER.

A prize offered by the Society of Arts for the best material for cleansing fabrics without discoloration or injury, has been awarded to a preparation of which the potato is the base. Two good-sized potatoes are grated into a pint of water, strained through a course sieve into another vessel containing a pint of clear water and allowed to stand until thoroughly settled, when the clear liquid is poured off, and used to sponge materials which are then washed in clean water, dried and ironed. The sediment can be used for cleaning carpets, etc.—Bos. Journal of Commerce.

SHE PARALYZED 'EM.

Counsel—What is your age, madam?

Witness—Forty-seven, sir.

Counsel—Married or single?

Witness—Single. I never had an offer of marriage in my life, and if it is of any interest to the court, I don't mind saying that I have worn false hair for 30 years.

Counsel—Hem! That is all, Madam. There is no use trying to shake the direct testimony of so truthful a woman as you are.—London Tit-Bits.

AN EDITOR'S OPINION.

The editor of the Murfreesboro (Tenn.) News thus accounts for hard times: "We let our timber rot and buy fencing. We throw away our ashes and grease, and buy soap; we raise weeds and buy vegetables; we catch 5-cent fish with four-dollar rods; we build school houses and send our children off to be educated, and, lastly, we send our boys out with a forty-dollar gun and a ten-dollar dog to hunt ten-cent birds."

STATE NEWS.

CALIFORNIA.

The work of tunneling for water is being vigorously prosecuted in Mill Creek Canyon, above Mentone.

According to the San Diego papers the new steamship line to connect San Diego with Japan and Honolulu will be in operation by October 1.

Another stage in the development of Randsburg is marked by the establishment of water works. Two years ago a team and a tub constituted the entire system and the fluid sold at \$2 a barrel.

A new corporation has been organized at Los Angeles under the name of the Ivanpah Smelting Company, with a capital stock of \$50,000. The company's purpose is the reduction of ores and minerals and to build and buy machinery, smelters, mills and to carry on a general mining business.

A fierce fire at Fresno, Aug. 13, destroyed about \$500,000 worth of property.

No lives were lost, but as some of the property destroyed was raisin packing plants, nearly 500 people were thrown out of employment. The fire is a great calamity to Fresno, as it is too late in the season to rebuild the packing plants in time to handle this year's crop of raisins, and thus a large market will be closed to the growers.

NORTH DAKOTA.

The *Larimore Pioneer* of Aug. 12, announced the death of Governor F. A. Briggs, from consumption. Lieut. Governor Devine will succeed to the office of chief executive of North Dakota and Senator H. F. Arnold, of Larimore will become lieutenant governor.

The greater part of the business portion of Bismark, was destroyed by fire recently, the loss being estimated high in the thousands, perhaps reaching the millions.

IOWA.

A great autumnal festival is to be held at Sioux City, the week beginning Oct. 3. The proclamation issued by the "Princes of Prosperity and Good Fellowship" command "all in the northwest who have joy and fun in their souls, to get together—to accumulate as it were—at Sioux City" on the above date.

IDAHO.

The early part of August a special train of fifteen carloads of wool left Boise for Chicago. Banners were tacked on all the cars and the train was an advertisement for the wool interests of the state.

NEBRASKA.

All users of city water in Lincoln are to be required to put in meters. It is believed this will not only add to the city revenue from this source, but will effect a saving in the amount of water used. And then think what a satisfaction it will be to the householder to "kick about the meter."

SEASON OPENS JUNE 22.

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